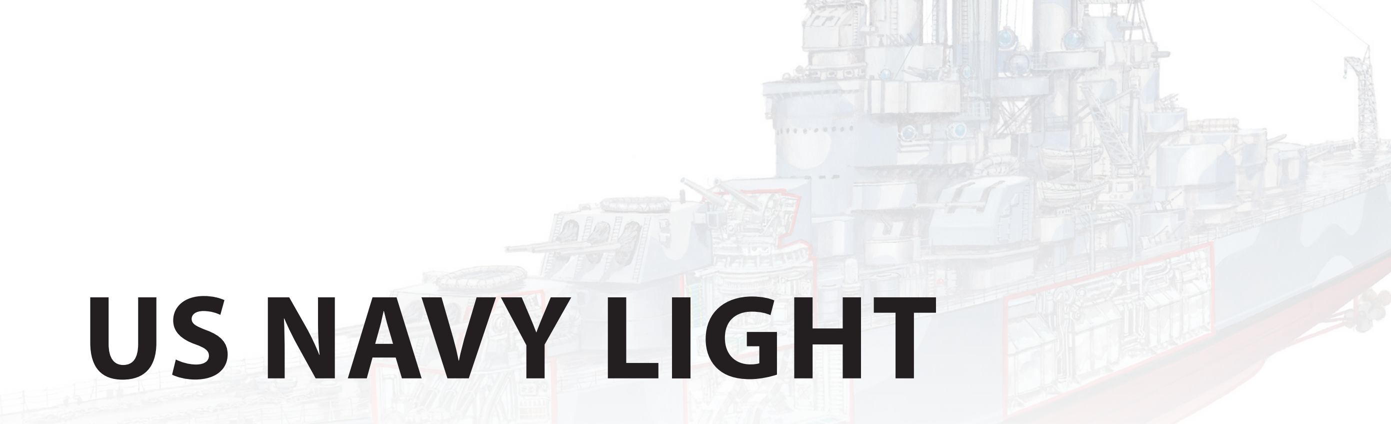


US NAVY LIGHT CRUISERS 1941–45

MARK STILLE

ILLUSTRATED BY PAUL WRIGHT

Author

Mark E. Stille (Commander, United States Navy, retired) received his BA in History from the University of Maryland and also holds an MA from the Naval War College. He has worked in the intelligence community for 30 years including tours on the faculty of the Naval War College, on the Joint Staff and on US Navy ships. He is currently a senior analyst working in the Washington, DC area. He is the author of numerous Osprey titles, focusing on naval history in the Pacific.

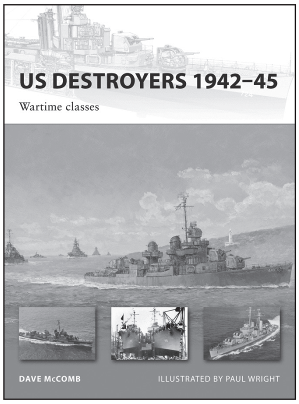
Illustrator

Paul Wright has painted ships of all kinds for most of his career, specializing in steel and steam warships from the late 19th century to the present day. Paul's art has illustrated the works of Patrick O'Brian, Dudley Pope and C.S. Forester amongst others, and hangs in many corporate and private collections all over the world. A Member of the Royal Society of Marine Artists, Paul lives and works in Surrey, UK.

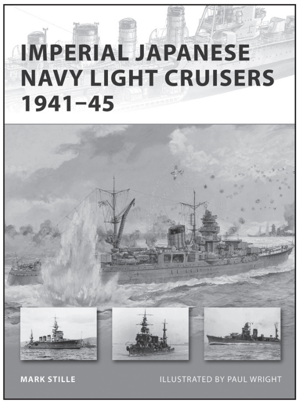
Other titles in the series

New Vanguard
OSPREY PUBLISHING
German Light Cruisers 1939–45
Gordon Williamson • Illustrated by Ian Palmer

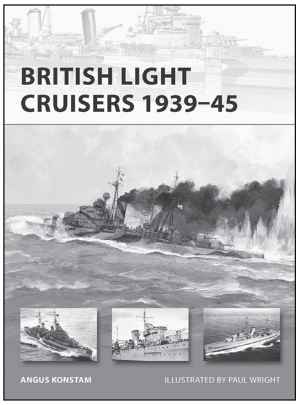
NVG No: 84 • **ISBN:** 978 1 84176 503 7


US DESTROYERS 1942–45
Wartime classes
DAVE McCOMB
ILLUSTRATED BY PAUL WRIGHT

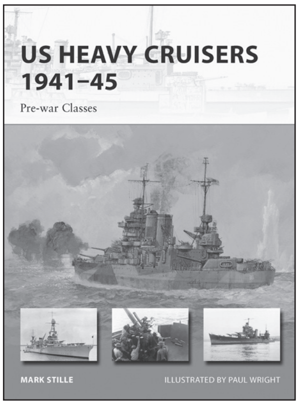
NVG No: 165 • **ISBN:** 978 1 84603 444 2


IMPERIAL JAPANESE NAVY LIGHT CRUISERS 1941–45
MARK STILLE
ILLUSTRATED BY PAUL WRIGHT

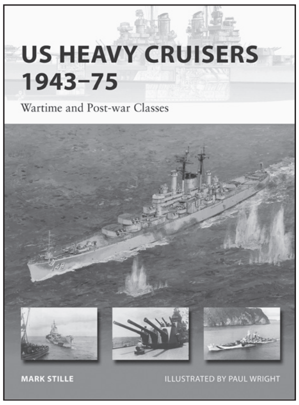
NVG No: 187 • **ISBN:** 978 1 84908 562 5


BRITISH LIGHT CRUISERS 1939–45
ANGUS KONSTAM
ILLUSTRATED BY PAUL WRIGHT

NVG No: 194 • **ISBN:** 978 1 84908 684 4


US HEAVY CRUISERS 1941–45
Pre-war Classes
MARK STILLE
ILLUSTRATED BY PAUL WRIGHT

NVG No: 210 • **ISBN:** 978 1 78200 629 9


US HEAVY CRUISERS 1943–75
Wartime and Post-war Classes
MARK STILLE
ILLUSTRATED BY PAUL WRIGHT

NVG No: 214 • **ISBN:** 978 1 78200 632 9

NEW VANGUARD 236

US NAVY LIGHT CRUISERS 1941–45

MARK STILLE

ILLUSTRATED BY PAUL WRIGHT

This electronic edition published in 2016 by Bloomsbury Publishing Plc

First published in Great Britain in 2016 by Osprey Publishing,
PO Box 883, Oxford, OX1 9PL, UK
1385 Broadway, 5th Floor, New York, NY 10018, USA
E-mail: info@ospreypublishing.com

Osprey Publishing, part of Bloomsbury Publishing Plc

© 2016 Osprey Publishing Ltd.

All rights reserved
You may not copy, distribute, transmit, reproduce or otherwise make available this publication (or any part of it) in any form, or by any means (including without limitation electronic, digital, optical, mechanical, photocopying, printing, recording or otherwise), without the prior written permission of the publisher. Any person who does any unauthorised act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

A CIP catalog record for this book is available from the British Library

Print ISBN: 978 1 4728 1140 0
PDF ebook ISBN: 978 1 4728 1141 7
ePub ebook ISBN: 978 1 4728 1142 4

To find out more about our authors and books visit www.ospreypublishing.com. Here you will find our full range of publications, as well as exclusive online content, details of forthcoming events and the option to sign up for our newsletters. You can also sign up for Osprey membership, which entitles you to a discount on purchases made through the Osprey site and access to our extensive online image archive.

Osprey Publishing supports the Woodland Trust, the UK's leading woodland conservation charity. Between 2014 and 2018 our donations will be spent on their Centenary Woods project in the UK.

www.ospreypublishing.com

Title page image: *Huntington* was not commissioned until early 1946. This view shows the other differences from the Cleveland class. The 40mm battery has been increased to three quad mounts on each beam and the positions of the Mk 34 and Mk 37 directors have been transposed with the Mk 37 mounted lower on the superstructure. The electronics fit includes an SK-2 on the foremast and an SP radar on the mainmast.

CONTENTS

INTRODUCTION 4

- American Naval Strategy and the Role of the Light Cruiser
- The Impact of the Washington and London Naval Treaties

AMERICAN LIGHT CRUISER WEAPONS 8

AMERICAN LIGHT CRUISER RADAR 10

USN LIGHT CRUISERS AT WAR 11

THE LIGHT CRUISER CLASSES 15

- Omaha Class
- Brooklyn Class
- Atlanta Class
- Cleveland and Fargo Classes
- Worcester Class

ANALYSIS AND CONCLUSION 42

BIBLIOGRAPHY 47

INDEX 48

US NAVY LIGHT CRUISERS 1941–45

INTRODUCTION

This book covers every United States Navy (USN) light cruiser ever completed. The first true class of USN light cruisers was designed in the aftermath of World War I to produce a ship suitable for scouting duties for the battle fleet. After the completion of the ten-ship Omaha class, the USN's attention turned to building heavy cruisers. Not until 1935 did the USN return to light-cruiser construction with the Brooklyn class. This excellent design became the basis for the most-produced light cruiser class in history, the 26-ship Cleveland class. In the run-up to World War II, the USN also designed and built a class of smaller cruisers suitable for work with destroyers. The Atlanta class was not actually designed as an antiaircraft cruiser as is commonly believed, but was used as such during the war. The last light cruisers built for the USN were the Fargo and Worcester classes which were completed after World War II. The two ships of the Worcester class were the largest and most advanced American light cruiser ever constructed.

American Naval Strategy and the Role of the Light Cruiser

At the end of the 19th century, the USN was primarily a cruiser navy. There were different types of cruisers in service, each with a specific set of capabilities and missions. Armored cruisers were built for fleet operations and commerce raiding and were literally fast battleships. Others were built for showing the flag and providing a presence to defend American interests. These were a mix of protected and "peace" cruisers. Beginning in the 1890s, USN construction funds were shifted to the building of battleships, and cruiser construction declined. With Congress unwilling to spend enough to create a balanced fleet, the only cruisers funded were armored cruisers and "peace" cruisers. Building scout cruisers to provide support for the battleships was neglected.

When the United States entered World War I in 1917 the USN had only three modern scout cruisers.

As the USN evolved from a cruiser navy built for commerce raiding and overseas presence to a fleet built for command of the sea centered on a battle fleet, the role of cruisers evolved. The new strategy of sea control called for a balanced battle fleet in which cruisers played important roles. Large armored cruisers remained useful for independent raiding operations or working with the main battle fleet. Smaller cruisers, eventually known as light cruisers, were tasked primarily with supporting the battle fleet by

Cleveland-class cruisers were heavily used to screen the Fast Carrier Force. This is *Miami* on February 12, 1945 with Task Force 58.1 which was en route to the Japanese home islands.

scouting. Scouting required two different types of ships since it was seen as two different missions. Strategic scouting sought to develop information on the arrival of an enemy fleet in a given theater, while tactical scouting was required when the two opposing fleets were near or in contact. This tactical information was essential if the fleet commander was to deploy his force correctly. Just as the USN required scouting information, the enemy also required intelligence on the movement of the American fleet. Scouting cruisers also had the job of screening their fleet and denying the enemy information of its movement.

Over time, and in particular with the introduction of aircraft and later radar, scouting requirements for USN cruisers diminished. What became more important was the requirement to protect the battle fleet from attack by enemy cruisers and destroyers. This was especially apparent after World War I when the USN looked at the Imperial Japanese Navy (IJN) as its next likely opponent. The Japanese were locked into a position of battleship inferiority by the Washington Naval Treaty of 1922 so were constantly seeking ways to compensate. What the Japanese came up with was an elaborate doctrine which emphasized nighttime torpedo attacks by cruisers and destroyers against the USN's battle fleet. USN cruisers were ideal platforms to counter this threat. Japanese aircraft were also increasingly seen as a threat and it became a standard requirement for USN cruisers to mount a powerful antiaircraft battery.

The Washington Naval Treaty set the maximum size of cruisers at 10,000 tons with guns no larger than 8 inches. The treaty did not set the number of cruisers which could be built, but with other naval powers building to the maximum limits, the USN was also forced to do so. Large cruisers with 8-inch guns were initially favored by the USN since their guns had greater penetrative power. This made them better suited for operating with the battle fleet and also better suited as a commerce raider since they could contend with an opposing cruiser also armed with 8-inch guns. However, a smaller (light) cruiser with 6-inch guns had several favorable attributes. Light cruisers were cheaper which meant more could be built. The 6-inch gun had a greater rate of fire which meant it was better suited to deal with enemy destroyer attacks. Six-inch cruisers were also thought to be the right size for commerce protection. The ambivalence the USN had between the 6- and 8-inch guns was shown after the collapse of the treaty system in the mid-1930s. When the

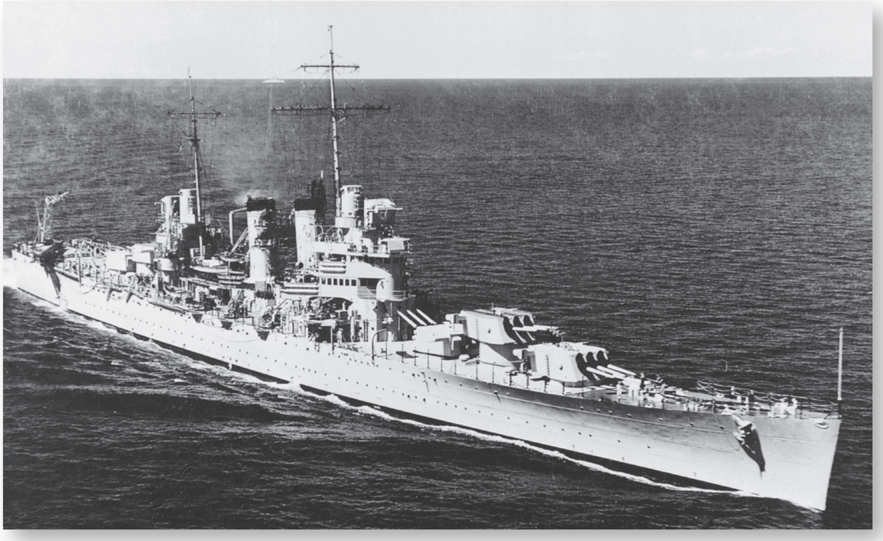
USN no longer faced tonnage restrictions for cruisers, it devised an immense cruiser-building program which included large cruisers (the Alaska class, often referred to incorrectly as battlecruisers), three classes of heavy cruisers, and four classes of light cruisers. It is important to note that the preponderance of wartime cruiser building was of light cruisers which the USN had come to believe was the more effective type of cruiser.

With the USN's entry into World War II, the primary role of the cruiser became fleet escort. Independent missions such as commerce raiding turned out to be an entirely false notion. The independent role of the cruiser was also neutered by the rise of air power which made it essential to operate as part of a task force. The USN's light cruisers played an important role in all major operations and were an essential ingredient of victory in the Pacific War.

The Impact of the Washington and London Naval Treaties

Either directly or indirectly, naval treaties in the 1920s and 1930s shaped all but one class of USN light cruisers. The Washington Naval Treaty set a limit for battleship and carrier construction, and established the maximum size of a cruiser. But since no limit was set on cruiser construction, a building spree for 10,000-ton cruisers promptly ensued. The USN, which faced interwar parsimony from Congress for shipbuilding budgets, elected to spend its limited funds on building the largest cruisers possible under treaty limitations.

The American desire to extend the limits on battleship construction and the British Royal Navy's (RN) desire to extend tonnage limitations to other classes of warships led to the London Conference of 1930. The USN wanted to stick to construction of large 8-inch cruisers since they had the range to operate over the considerable distances found in the Pacific and had equivalent firepower to existing IJN cruisers. Despite USN and RN differences over cruiser construction, an agreement was reached in 1930 to extend tonnage limitations to cruisers (and also destroyers and submarines). Cruisers were divided into two clear types: heavy cruisers limited to 10,000 tons with guns no larger than 8 inches and light cruisers with guns 6.1 inches or less. Total cruiser tonnage for the USN was set at 323,500 tons, which included the permitted 18 heavy cruisers. The remaining 143,500 tons



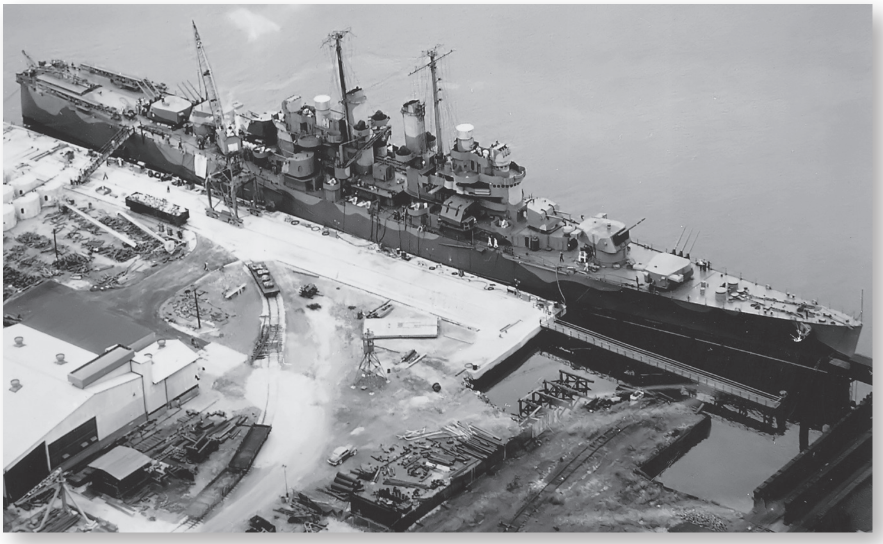
A fine starboard bow view of *Honolulu* in February 1939. This prewar view of a Brooklyn-class cruiser shows no search or fire control radars, a closed bridge, and a total absence of 20mm or 40mm guns.

for light cruisers consisted of 70,500 tons for the ten Omaha-class ships and some 73,000 tons for new construction. The London Treaty thus allowed the construction of seven Brooklyn-class light cruisers, each of almost 10,000 tons. The treaty's provision to replace aging ships (in this case the first Omaha-class cruisers), combined with some weight savings from the first seven ships, also allowed the construction of two more modified Brooklyns.

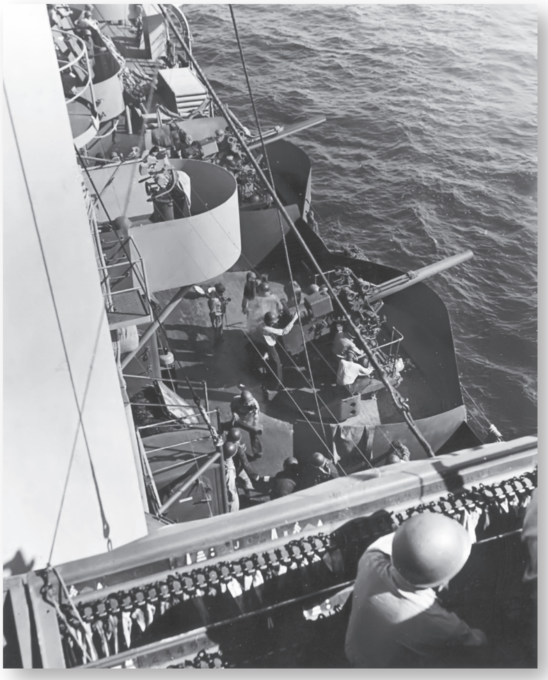
The Atlanta-class cruisers were not designed as antiaircraft cruisers, but instead as destroyer leaders. Here is *Atlanta* in July 1942 maneuvering with a division of destroyers. After the Atlanta-class light cruisers were used in their intended role off Guadalcanal which resulted in the loss of two ships, they were only used for carrier-screening operations for the rest of the war.

The decision to build large 10,000-ton light cruisers instead of a greater number of smaller ships was contentious. The Brooklyn class endorsed the concept that a large ship was required since it could be properly protected. Some studies suggested that it could be better protected than the heavy cruisers already in service. Another key design factor was the requirement for great endurance for Pacific operations. In this regard, 10,000nm at 15 knots was seen as the minimum. A larger ship would also possess better seakeeping characteristics. Finally, a large cruiser would be big enough to mount the required four triple 6-inch gun turrets. The prevailing view was that the necessary combination of endurance, protection, and firepower could not be designed into a ship any less than 8,500 tons. So, while European powers designed light cruisers in the 7,000-ton range, the USN and IJN favored larger ships.

The Japanese withdrawal from the naval treaty system, announced in August 1934, caused the collapse of the treaty structure. The Second London Treaty of 1936 kept the size and capabilities limits of cruisers but abandoned the most important aspect of the previous treaty – the overall limitation on tonnage. The British were successful in eliminating the construction of large 8-inch cruisers, since the limit on new cruisers was set at 8,000 tons with guns no larger than 6 inches. Only the United States, Great Britain and France signed the treaty, which also contained an escape clause which



This is *Cleveland* at the Philadelphia Navy Yard in 1942 in her early-war configuration. No radars or smaller antiaircraft guns have yet been fitted. The ship is in an Ms 12 scheme.



The standard secondary gun on the Brooklyn class was the 5-inch/25. These are 5-inch/25 guns on *Phoenix* firing on targets on Japanese-held Corregidor Island in the Philippines on February 14, 1945. The 5-inch/25 could engage both air and surface targets with its 54-pound projectile.

allowed the signatories to counter construction by a non-treaty power.

The next USN cruiser design, the Atlanta class, was affected indirectly by the 8,000-ton limit for new cruisers. The USN's first thought was to build a smaller version of the Brooklyn class on the 8,000-ton hull which would have a main battery of 6-inch guns and an antiaircraft battery of 5-inch guns. This proved impossible given the 8,000-ton limit, and a concept to develop a dual-purpose 6-inch mount to solve this problem also proved impossible. These problems led to the adoption of a new ship of only 6,000 tons fitted with a battery of the successful 5-inch/38 dual-purpose gun.

In 1934, the Vinson-Trammell Act was passed which permitted the USN to bring its strength up to permitted treaty tonnage limits. Once the USN was up to its allotted treaty strength, further legislation was passed in 1938 and 1940 for a dramatic expansion of American sea power. This had to be done with existing designs since there was not enough time to create new designs which might be better suited to prevailing requirements. This was epitomized by the Cleveland class which was a modified Brooklyn.

The only class not impacted by treaty limitation was the USN's final class of light cruisers. The Worcester class was built around the dual-purpose automatic 6-inch gun which had long been in development. The result was an immense ship of 18,000 tons full load displacement which was not completed until after the war.

AMERICAN LIGHT CRUISER WEAPONS

The 6-inch guns on the Omaha class were originally intended as the secondary battery on the canceled South Dakota-class battleships and the Lexington-class battlecruisers. They were hand-worked with bag charges and thus had a relatively low rate of fire.

The Brooklyn class introduced one of the USN's most successful guns in its history, the 6-inch/47. The USN long debated the effectiveness of the 6-inch gun compared to the 8-inch gun. The 8-inch gun had several advantages, such as range, a larger shell which created greater penetrative power, and larger splashes which were easier to spot. In comparison, the 6-inch gun had the advantage of a faster rate of fire. In prewar exercises, a rate of up to ten rounds per gun, per minute was achieved. With its battery of 15 6-inch guns, a Brooklyn-class cruiser could smother a target in a rain of shells. The range advantage of the 8-inch gun was minimized by the likely effects of weather and light which made it unlikely that engagements would be conducted at extended ranges. In an engagement against surface targets, the USN came to see the 6-inch gun as superior.

The 6-inch/47 Mark (Mk) 16 gun was placed in a triple turret. All three guns elevated in the same sleeve and could be raised to 60 degrees, but they were incapable of antiaircraft fire. The maximum range was 26,118 yards at 47 degrees. The rate of fire was greatly enhanced by use of semi-fixed ammunition which combined the shell with a brass cartridge containing the powder and primer. The shell weight was 130 pounds. The effectiveness of the 6-inch/47 was greatly enhanced by its excellent fire-control systems. These were the most modern available at the time and greatly superior to their IJN counterparts. The Brooklyn class introduced the Mk 34 director which was a great improvement on earlier systems. During World War II, the Mk 34 was coupled with the Mk 3 fire-control radar, and then the improved Mk 8 or Mk 13 radars. These systems allowed the 6-inch batteries to engage targets quickly in any light or weather conditions.

The excellent 5-inch/38 dual-purpose gun was the main battery on the Atlanta class and constituted the secondary battery of some Brooklyn-class and all Cleveland-class ships. These were given a separate fire-control director with the Mk 33 replacing the original Mk 28 directors on the Brooklyns. The best fire-control director of the war was the Mk 37 which, when paired with the 5-inch/38, gave good protection against conventional air attack. It was introduced on the Atlanta class and equipped all Cleveland-class cruisers, remaining in service until well after the war. Its effectiveness was also improved by radar; it was paired with the Mk 4 fire-control radar early in the war, then replaced with a Mk 12 radar combined with the Mk 22 height finder. The early-war standard was to fit two antiaircraft fire directors on a cruiser. This made the ship essentially able to engage two targets unless local control was used which was much less accurate. Later in the war, light cruisers received the Mk 51 director which could control 40mm mounts and the 5-inch/38. In 1945, the Mk 57 and Mk 63 directors were introduced which allowed a night and bad weather engagement capability.

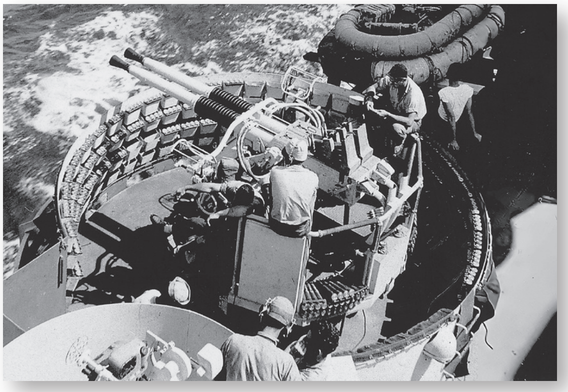
USN Light Cruiser Main and Secondary Guns

Type	Muzzle Velocity (ft/sec)	Max Range (yards)	Rate of Fire
6-inch/53	3,000	25,300	6–8 rds/min
6-inch/47	2,500	26,118	8–12 rds/min
5-inch/25	2,110	14,500	14 rds/min
5-inch/38	2,600	18,200	15–20 rds/min

USN Light Cruiser Antiaircraft Guns

Type	Muzzle Velocity (ft/sec)	Max Range (yards)	Rate of Fire (theoretical)
.50-inch Browning M2 water-cooled machine gun	2,930	7,400	550–700 rds/min
1.1-inch Mk 1/1	2,700	7,400	140 rds/min
20mm Oerlikon	2,740	4,800	450 rds/min
40mm Bofors	2,890	11,000	160 rds/min
3-inch/50	2,700	14,590	15–20 rds/min

At the start of the war, USN light cruisers possessed inadequate antiaircraft capabilities. A study was ordered in June 1940 to determine requirements for air defense and the adoption of the quadruple 1.1-inch mount was recommended. However, these were in short supply so many ships had to make do with single 3-inch/50 guns instead. It was quickly recognized that the quad 1.1-inch weapon was unreliable in service and was still inadequate. To handle air threats, the USN planned to fit light cruisers with 40mm and 20mm



guns as soon as possible. The quadruple 40mm mount was preferred, but it weighed much more than the 1.1-inch quad mounts, and proved difficult to mount on many cruisers which were already facing stability problems. The twin 40mm mount was more easily fitted because of its reduced weight, but most light cruisers eventually received at least some 40mm quadruple mounts. These were the best intermediate-range antiaircraft weapons of the war. Supplementing the 40mm mounts were single 20mm guns which could be bolted anywhere with a clear arc of fire.

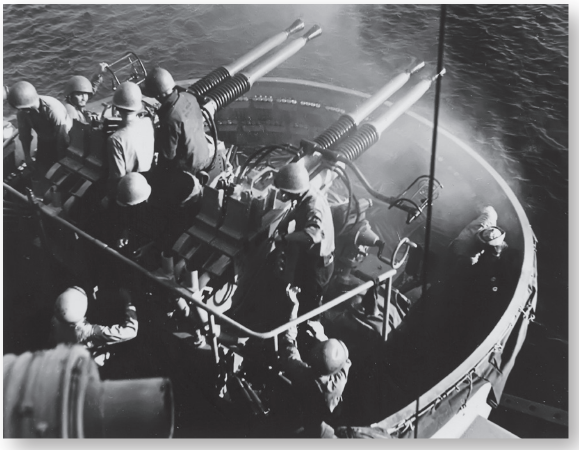
The USN's highly successful 40mm Bofors gun came in twin and quad mounts. The higher volume of fire from the quad mount was preferred, but its weight of 12 tons with shield meant it could not be mounted on smaller cruisers or that only a small number could be mounted on larger ships with stability issues. This is the Mk 1 twin mount shown aboard *San Juan* in February 1945. This mount weighed between 5.8 and 6.7 tons, allowing it to be mounted aboard any cruiser.

AMERICAN LIGHT CRUISER RADAR

The first radar fitted aboard a USN light cruiser was the CXAM-1 aboard *Cincinnati* in 1941. This set had a theoretical maximum detection range of 16nm against large surface targets and 70nm against a large aircraft at 10,000 feet. In 1942, this was replaced by the SC radar. This set unsuccessfully tried to combine the CXAM's electronics with a smaller antenna. The improved SC-1 was more successful since its greater power translated into almost twice the range compared to the SC. The SC/SC-1 was replaced by the much more powerful SK air search radar beginning in 1943. This could detect a large target at up to 100nm flying at 10,000 feet. The SP radar was fitted aboard a few cruisers late in the war as part of the effort to counter the kamikaze threat. This radar provided reliable altitude data which was crucial for fighter direction.

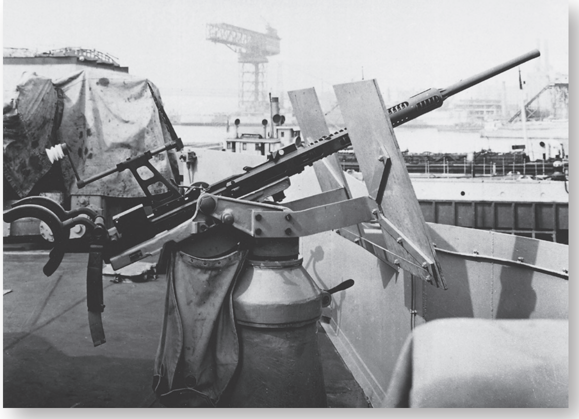
The mainstay light cruiser surface-search radar was the SG. This was the first microwave radar to incorporate a plan position display which showed a map of the search area and made interpretation much easier. This set reached the fleet in 1942, and the improved SG-1 entered service in May 1943. Light cruisers usually carried two SG sets, one each on the two pole masts. Optimal range was 22nm against a battleship-sized target.

The USN pioneered the creation of the combat information center (CIC) to handle the influx of radar and other data. Data fused in the CIC was used to guide the employment of the ship's weapons in the most effective manner. Most light cruisers had their CICs placed above the main deck in the superstructure which were largely unprotected. Ships completed after the war had fully protected CICs which were placed within the armored citadel.



The 40mm quad gun was the preferred antiaircraft weapon for cruisers, but its weight presented a problem for ships with stability issues. Production shortages of the weapon were not alleviated until 1944, and by then the kamikaze threat made the USN look for ways to increase its numbers of ships. Even the 40mm gun was not ideal to handle the kamikaze threat since the shell was too small to accept a VT proximity fuse and proved insufficient to completely break up a kamikaze before its ballistic path took it into the target ship. This is a 40mm mount on *Birmingham* in action on April 16, 1945 being used to engage a surface target on Ie Shima.

USN LIGHT CRUISERS AT WAR



All USN light cruisers received 20mm Oerlikon guns. This is a single mount pictured on *Cincinnati* in July 1942. These guns did not need an external power source so they could be fitted anywhere with a clear arc of fire, but relied on an optical sight for fire control. With a short effective range and an 8.5-oz projectile, these were unable to deal with the kamikaze threat late in the war and were gradually replaced in favor of 40mm mounts.

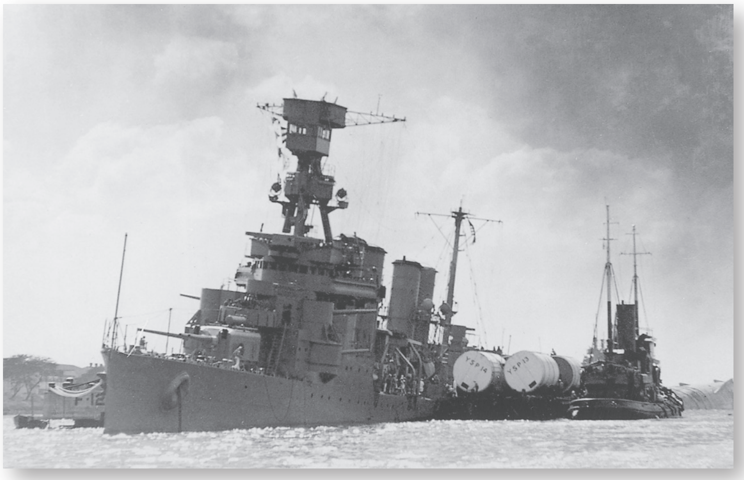
Despite the overall American strategy which called for the main effort to be devoted in the Atlantic theater against Germany, the USN successfully diverted the vast proportion of its strength to its largely private war in the Pacific against the Japanese. An example of this was its light cruiser force. While the majority of the Omaha class served in the Atlantic, very few of the modern ships did. Four of the Brooklyn class began the war in the Atlantic but, following the transfer of *Nashville* to the Pacific early in 1942, this left only three Brooklyns which spent their careers in Europe. Additionally, only two of the 26 Cleveland-class light cruisers saw combat in the Atlantic or Mediterranean theaters.

The USN's light cruiser war in the Atlantic was limited to patrol and bombardment duties. On only one occasion, the attack on Casablanca during the invasion of North Africa, did a USN light cruiser engage a surface target.

The Omaha class was rarely assigned to front-line duties. Six of the ten ships began the war assigned to the Atlantic and performed well patrolling primarily in the South Atlantic against Axis supply ships and blockade runners. Only two of the ships were used in amphibious operations, and this was during the invasion of southern France in August 1944. In the Pacific, the Omahas were not sent to high-threat areas. The most telling fact about how they were viewed was that even as the USN's cruiser force was stretched to the maximum extent imaginable during the Guadalcanal campaign because of heavy losses, there was no consideration given to sending the Omaha-class ships to the South Pacific. After *Marblehead* was damaged by aircraft bombs in early 1942, only three Omaha-class ships remained in the Pacific. All of these were employed in the North Pacific where the threat was much reduced. One of these, *Richmond*, took part in a long-range gunnery duel against a larger IJN cruiser force in the battle of the Komandorski Islands and survived undamaged.

Beginning in August 1942, the USN's cruiser force took the brunt of the grinding six-month battle of attrition around Guadalcanal in the southern Solomons. The main burden was carried by the heavy cruisers since they were more numerous than the six Brooklyns and the first four Atlanta-class units in the Pacific, and because the USN preferred the heavier 8-inch shell when engaging IJN heavy cruisers or battleships. There were five major surface battles fought around Guadalcanal, and USN light cruisers participated in three of them. The USN suffered heavily in

Birmingham was one of five USN light cruisers assigned to support the July 1943 landings on Sicily which at the time was the largest amphibious operation in history. *Birmingham* is shown firing on targets on July 10. USN naval gunfire was instrumental in defeating a strong Axis reaction against the landing.



The most heavily damaged Omaha-class cruiser of the war was *Raleigh* which was caught in Pearl Harbor on December 7, 1941. Here the cruiser is listing to port after being hit by a single Japanese Type 91 aerial torpedo. The ship was prevented from capsizing, but would have sunk if the attack had occurred in the open sea.

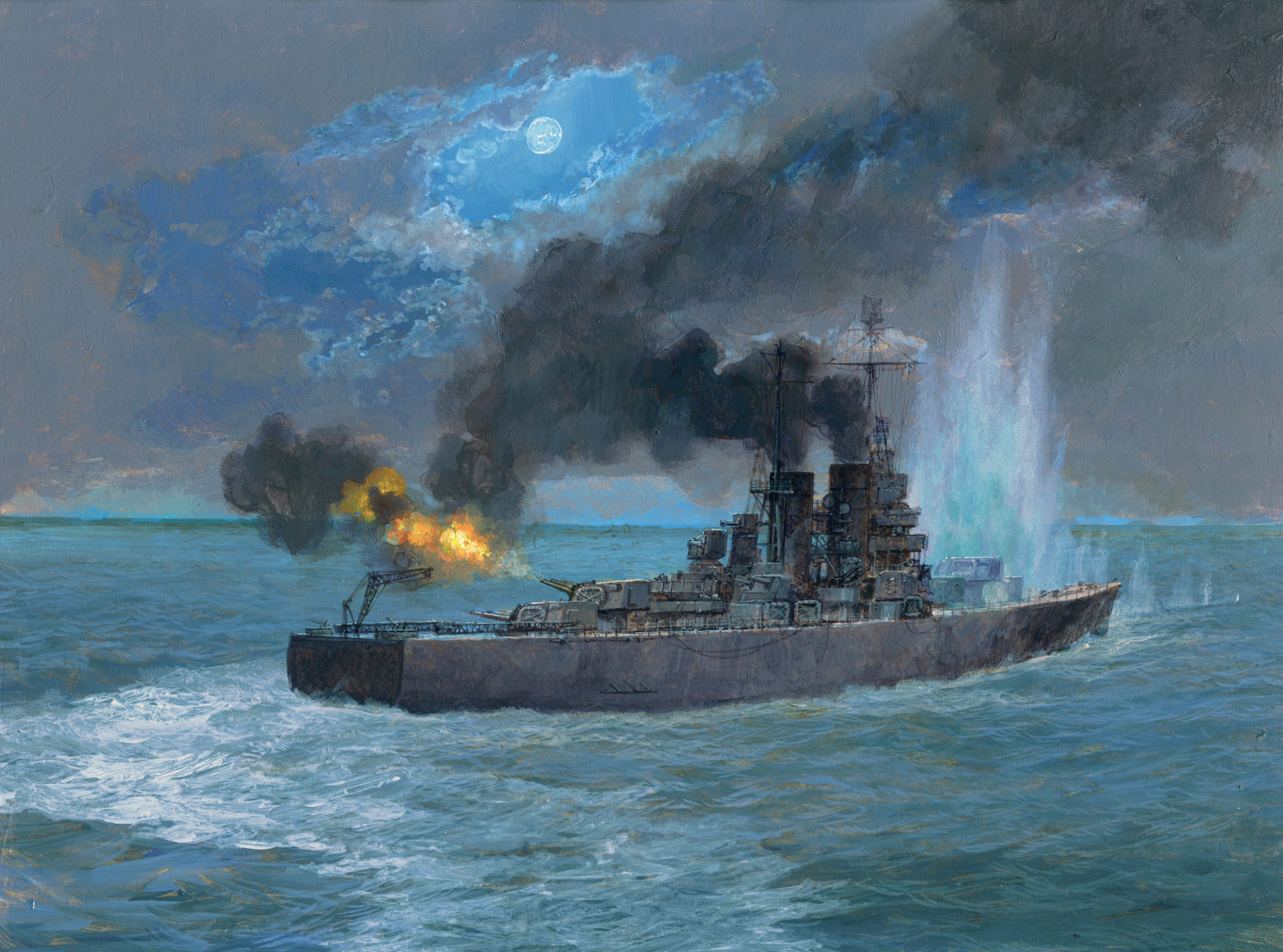
these battles since all were fought at night when IJN doctrine and training was superior. However, when radar gave the Americans the element of surprise, the results could be decisive as was the case at the battle of Cape Esperance on October 11–12 when a USN cruiser-destroyer force (including Brooklyn-class ships *Boise* and *Helena*) routed an IJN force. An IJN heavy cruiser and destroyer were sunk, and another heavy cruiser severely damaged by gunfire for the loss of a single American destroyer. In return, three shells hit *Boise* and inflicted heavy damage. One shell hit under the main belt and penetrated to the magazine area forward and caused a fire. Only the onrush of water from the shell hit prevented a magazine explosion. A second shell hit under the waterline forward and caused a large hole. The final shell hit the face of Turret 3 but did not penetrate.

The next clash involving USN light cruisers was on November 12–13 at the First Naval Battle of Guadalcanal. Among the five USN cruisers engaged in a desperate attempt to thwart an IJN operation to neutralize the American-held airfield on the island with a battleship bombardment, were light cruisers *Helena*, *Atlanta*, and *Juneau*. The battle turned into a close-quarters brawl which was costly for both sides. *Atlanta* was engaged by four IJN ships, including battleship *Hiei*, and then was shot up further by USN heavy cruiser *San Francisco*. In a span of minutes, the cruiser took some 32 hits, and then was hit by a Japanese torpedo. The badly damaged ship was scuttled the next night. *Juneau* was hit by another destroyer-launched torpedo, and *Helena* suffered minor damage from three 5-inch hits. While retiring the next

A

HELENA IN ACTION IN THE KULA GULF IN JULY 1943

Helena was the largest USN light cruiser sunk during World War II and this occurred during the campaign for the Central Solomons. By July 1943, the United States had landed troops on Rendova Island near the main Japanese base and airfield at Munda on New Georgia Island. When the Japanese sent a "Tokyo Express" of ten destroyers with reinforcements to Munda, the USN responded with a task group built around the light cruisers *Honolulu*, *Helena*, and *St. Louis* with an escort of four destroyers. The stage was set for a clash pitting USN 6-inch gun cruisers against the formidable Type 93 torpedoes aboard the Japanese destroyers. Early on July 6, the Americans first received a radar contact at 0140 hours at some 27,400 yards. At 0147 hours, lookouts aboard the lead Japanese destroyer *Niizuki* spotted the USN task group. It took until 0157 hours for the Americans to open fire which squandered their initial detection advantage. The rapid-fire guns from the three cruisers sent a tremendous barrage of 2,500 rounds against the Japanese in only a few minutes. This radar-guided barrage hit *Niizuki* and put her out of action, but the next two destroyers suffered only light damage. These ships immediately sent a salvo of 16 torpedoes against the non-maneuvering cruiser line. The results were predictable – at 0204 hours the first torpedo hit *Helena* between No. 1 and No. 2 turrets. Minutes later at 0207, two more struck the cruiser in the same general location amidships. The first torpedo blew the bow off, and the next two delivered the coup de grâce. Some 22 minutes after the first hit, *Helena*'s hull disappeared under the water. No light cruiser could be expected to survive such damage, especially after the last two torpedoes hit in the same area and broke the ship's back, causing her to slowly jackknife.



morning, *Juneau* was hit by a torpedo from a Japanese submarine. The hit caused a catastrophic magazine explosion which sank the ship in seconds. Only ten crewmen of almost 700 aboard survived. After this engagement, the USN never placed an Atlanta-class cruiser in a major surface battle again. For their part, *Atlanta* helped sink a Japanese destroyer, *Helena* crippled another one, and *Atlanta* and other USN ships damaged *Hiei* which led to the failure of the Japanese operation.

During the battle of Tassafaronga on 30 November, the last engagement of the Guadalcanal campaign involving a USN light cruiser, *Honolulu* and four heavy cruisers were smashed by a Japanese destroyer force with *Honolulu* being the only cruiser not hit by torpedoes.Throughout the campaign, the USN failed to comprehend the range advantage possessed by IJN torpedoes over cruiser guns. It was at this point that the USN decided that chasing destroyers with heavy cruisers was ill-advised and decided to put light cruisers with their faster-firing guns in the forefront. By 1943, when the light cruisers led the advance through the Central and Northern Solomons, radar was both technically and doctrinally mature, and it played the key role in reducing and then eliminating the IJN's advantage in night combat.

The first encounter involving the light cruisers was on March 6, 1943 when *Cleveland*, *Montpelier*, and *Denver* encountered two Japanese destroyers off Kolombangara Island in the Central Solomons. Using radar, the cruisers were able to detect the Japanese first and then smother them in 6-inch shellfire. Both destroyers were sunk with no loss to the Americans. This small-scale encounter seemed to validate the USN's new night-fighting doctrine and the role of the light cruiser. In reality, it demonstrated that the side that gained the surprise usually translated it into victory. In the next engagement, the battle of Kula Gulf on July 5–6, a USN task force led by *Helena*, *Honolulu*, and *St. Louis*, again gained surprise with radar, but concentrated its fire on the lead Japanese destroyer. The Japanese recovered quickly and unleashed a torpedo barrage which turned the battle. *Helena* was struck by three torpedoes; the first took off her bow, and the next two hit in the same area which knocked out all power and then caused the ship to jackknife as she sank. The Americans claimed to have sunk three IJN destroyers and damaged five more with radar-controlled gunfire, but the true toll was a single destroyer sunk. Only days later, at the battle of Kolombangara on July 12–13, the superiority of IJN torpedoes over USN gunfire was again demonstrated. This time, neither side gained the surprise. *Honolulu* and *St. Louis* were both hit by torpedoes and had their bows blown off; a New Zealand light cruiser was hit and heavily damaged; and an American destroyer was also sunk by a torpedo. The cost to the IJN was a light cruiser which was sunk by 6-inch gunfire from the cruisers.

This brought an end to USN attempts to chase Japanese destroyers in the restricted waters of the Solomons with light cruisers. Destroyers were now given this mission. There was one more Solomons encounter in which USN light cruisers played a prominent role. This was the battle of Empress Augusta Bay on November 2 when an American task force of light cruisers *Cleveland*, *Columbia*, *Montpelier*, and *Denver*, escorted by eight destroyers, took on an IJN force of two heavy and two light cruisers and six destroyers which was attempting to attack an American landing on Bougainville Island. The battle did not go according to plan for either side, but the USN had finally learned to minimize the IJN's torpedo threat with radical high-speed maneuvering. The cruisers pumped out an incredible volume of fire – 4,591 6-inch and 705 5-inch shells – but scored only about a dozen hits, several of which were duds. Nevertheless, this was sufficient to sink a light cruiser and damage several other ships. Another Japanese destroyer was sunk by the USN destroyers. *Denver* and *Columbia* were both hit by dud 8-inch shells which caused minor damage. This was the finest moment of the USN's light cruisers during the war.

After the Solomons campaign, USN light cruisers only saw action against major Japanese surface targets on three other occasions. All were during the series of actions collectively known as the battle of Leyte Gulf. In Surigao Strait on October 25, 1944, *Boise*, *Phoenix*, *Denver*, and *Columbia* were part of an overwhelmingly strong force which defeated a Japanese force attempting to enter Leyte Gulf. That same day off Cape Engano, *Santa Fe* and *Mobile* were part of a cruiser-destroyer force ordered to finish off ships already crippled from USN air strikes. The cruisers sank the carrier *Chiyoda* and then chased down and sank a destroyer. The following day, *Vincennes*, *Biloxi*, and *Miami* surprised and sank a single IJN destroyer which was trying to escape through the San Bernardino Strait.

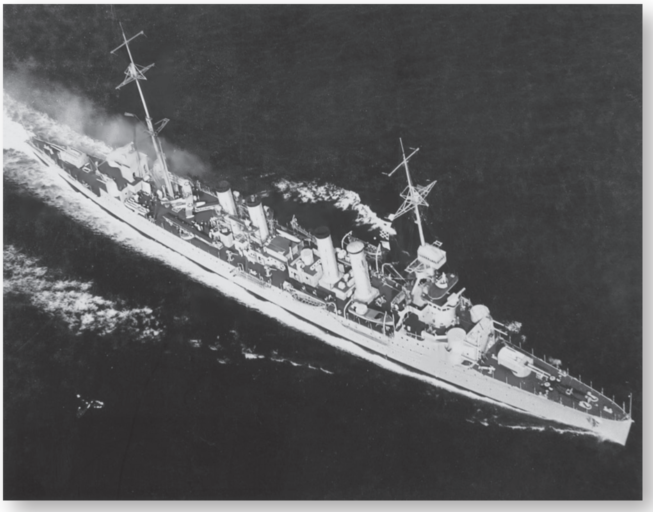
Aside from these actions, after 1943 USN light cruisers served almost exclusively in roles which called for shore bombardment and antiaircraft screening. Prewar doctrine assigned heavy cruisers to escort carriers and light cruisers to support the battle line. Since the Pacific Fleet's battle line was rendered ineffective at Pearl Harbor, the light cruisers were used primarily for escort duty early in the war. Following the Solomons campaign, Brooklyn-class cruisers were used in supporting amphibious operations, most as part of the 7th Fleet which conducted a number of landing operations in the Philippines and later in the Netherlands East Indies (NEI). The Atlanta-class cruisers were used solely as carrier escorts from 1943 until the end of the war. The Cleveland-class ships were suited for any cruiser role. Many were incorporated into the Fast Carrier Force since they possessed good antiaircraft capabilities while others were assigned to screen amphibious operations and perform bombardment duties of Japanese island positions.

THE LIGHT CRUISER CLASSES

Omaha Class

Design and construction

Going into World War I, the USN had only three modern scouting cruisers. Requests for additional scout cruisers had been rejected by Congress every year from 1905. By 1915, with war raging in Europe, the need for a balanced fleet could no longer be delayed, so Congress finally approved the required funding in August 1916. It provided for ten battleships, six battlecruisers and ten scout cruisers over the fiscal years 1917–19. The scout cruisers became the Omaha class; four were planned to be built in 1917, followed by three in each of the next two years.



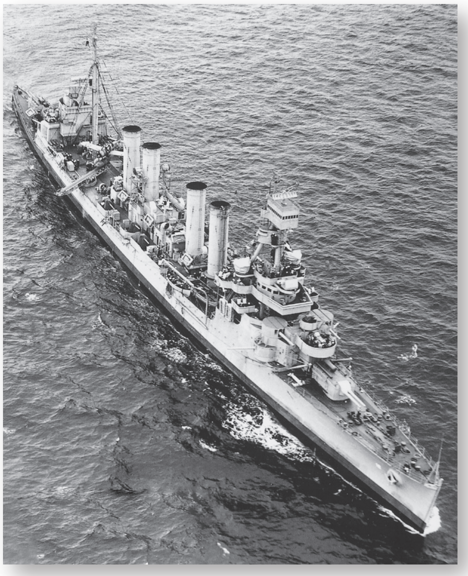
This view of *Marblehead* in 1933 shows the prewar configuration of the Omaha-class cruisers. The narrow beam of these cruisers is evident, as well as their tall stacks and masts. Note the forward cluster of six 6-inch guns. The antiaircraft battery consists of only two 3-inch guns on each beam.

To perform scouting duties, the new class had to have high speed, good endurance, and seakeeping. This new class had to act as both a strategic and tactical scout, so a larger ship was required to create the necessary endurance. After much debate, the Secretary of the Navy approved a 7,100-ton design which embarked a heavy battery of 6-inch guns, light protection and a high speed of 35 knots. This made them the fastest cruisers of their day. What finally emerged was a unique-looking cruiser with four tall, thin stacks on a narrow beam with fore and aft clusters of 6-inch guns. The other dominant design feature was the two large masts.

Omaha-Class Construction

Ship	Built at	Laid down	Launched	Commissioned	Fate
Omaha (CL4)	Todd Dry Dock and Construction, Tacoma, Washington	Dec. 6, 1918	Dec. 14, 1920	Feb. 24, 1923	Scrapped, 1946
Milwaukee (CL5)	Todd Dry Dock	Dec. 13, 1918	Mar. 24, 1921	Jun. 20, 1923	Returned from USSR in 1949 and scrapped
Cincinnati (CL6)	Todd Dry Dock	May 15, 1920	May 23, 1921	Jan. 1, 1924	Scrapped, 1946
Raleigh (CL7)	Bethlehem Ship Building, Quincy, Massachusetts	Aug. 16, 1920	Oct. 25, 1922	Feb. 6, 1924	Scrapped, 1946
Detroit (CL8)	Bethlehem, Quincy	Nov. 10, 1920	Jun. 29, 1922	Jul. 31, 1923	Scrapped, 1946
Richmond (CL9)	William Cramp and Sons, Philadelphia, Pennsylvania	Feb. 16, 1920	Sep. 29, 1921	Jul. 2, 1923	Scrapped, 1947
Concord (CL10)	William Cramp, Philadelphia	Mar. 29, 1920	Dec. 15, 1921	Nov. 3, 1923	Scrapped, 1947
Trenton (CL11)	William Cramp, Philadelphia	Aug. 18, 1920	Apr. 16, 1923	Apr. 19, 1924	Scrapped, 1947
Marblehead (CL12)	William Cramp, Philadelphia	Aug. 4, 1920	Oct. 9, 1923	Sep. 8, 1924	Scrapped, 1946
Memphis (CL13)	William Cramp, Philadelphia	Oct. 14, 1920	Apr. 17, 1924	Feb. 4, 1925	Scrapped, 1947

One of the principal design requirements was for high speed. To help accomplish this, a very high length-to-beam ratio of 10:1 was employed and machinery capable of producing 93,000 shaft horsepower (shp) fitted. This required 12 boilers driving four steam turbines. The widely spaced boilers required four stacks to vent the exhaust fumes which gave the ships their distinctive appearance. Endurance was designed as 9,000nm at 15 knots, but proved to be only 6,400nm at 10 knots. The cruising turbines on the first three ships were designed for 15 knots; the middle two ships had a combination plant which allowed for cruising up to 25 knots, and the last five ships could cruise at 20 knots. In service, the last five ships had a greater endurance than the first five.



Marblehead pictured in October 1942 after repairs from bomb damage earlier in the year and before her extensive modernization. The forward superstructure has been modified to provide an open bridge and single 20mm guns are starting to appear. A Mk 3 fire-control radar has been fitted on the roof of the fighting top.

Protection was light, as would be expected of a fast ship built for scouting. A 3-inch main belt was fitted at the waterline. Compartmentation was as extensive as possible to make up for the lack of hull protection. There was only 1.5 inches of deck armor, and the conning tower had 1.2 inches of protection. The 6-inch turrets and gun houses were provided with 1 inch of armor.

Another important requirement to perform scouting duties was the capability to carry aircraft. By World War II, the ships carried two catapults located forward of the aft superstructure which swung outboard to launch aircraft. Two aircraft were carried.

The design was weak in several areas. All of the additions during the design phase created an overloaded ship. The narrow beam made the ship very cramped. Seakeeping was generally good, but the lower aft casemate 6-inch guns were unusable at high speed or in heavy seas due to wetness; the lower torpedo tubes were also affected, and both were removed before the war. The twin 6-inch gun mount was cramped which reduced its rate of fire. The cruisers were insufficiently insulated which made them too hot for the tropics and too cold for northern waters. There was no wood deck, making the steel decks too hot. The crew suffered from inadequate toilet facilities and the lightly built hulls leaked.

In the final analysis, the Omaha class was not a success. The USN got a design incapable of strategic scouting, so this mission was assigned to the fleet's heavy cruisers. The Omaha-class cruisers were barely adequate for tactical scouting, and proved unnecessary in this role with the widespread introduction of scouting aircraft. When they first entered service, they were assigned as leaders of destroyer flotillas to provide them with the firepower necessary to repel a destroyer attack. By the start of the war, other more modern ships were employed in this capacity, so the Omaha-class cruisers were relegated to secondary duties and theaters.

Armament

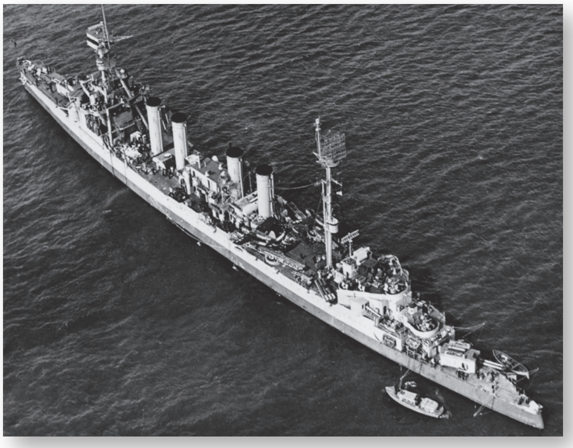
For their size, the ships were adequately armed, but the arrangement of the main armament was archaic. The main battery was maximized for end-on fire which resulted in the vertical pair of casemate guns – these remained the trademark of the class throughout its career. Two twin turrets were fitted fore and aft for a total of 12 6-inch guns. The lower casemate guns aft were soon removed bringing the main battery to ten 6-inch guns.

A heavy 21-inch torpedo battery was also fitted. Two twin torpedo mounts were fitted on the main deck aft on each beam, but these were also unworkable at high speed due to excessive wetness, so they were removed. This left two triple mounts fitted on the forecastle deck. Mine rails were also originally fitted with a capacity to carry 224 mines, but were removed early in their careers to save weight.

When designed, antiaircraft armament was a secondary concern. As built, the cruisers were limited to two 3-inch/50 guns on each side. After refit in the 1930s, the antiaircraft battery was brought up to six 3-inch/50 single mounts amidships and one each fore and aft for a total of eight. Also, four .50-cal machine guns were fitted in the foremast tub and four more on the aft superstructure to provide defense against dive-bombers.

Service Modifications

The ability of these ships to accommodate significant modernizations was greatly limited by their already overcrowded and overweight



This view of *Cincinnati* in March 1944 shows an Omaha-class cruiser in a late-war configuration. Note the two 40mm twin mounts and single 20mm guns on the aft superstructure. An SK radar is mounted on the mainmast to provide air search and a Mk 3 fire-control radar abaft the mainmast for main battery fire control.

condition. Before the war some weight had been removed with the landing of the twin torpedo mounts and the lower aft casemate guns. When the war began, the ship's antiaircraft and electronics suites were modernized. To compensate for this extra topside weight, the conning tower was removed and the bridge structure simplified.

Beginning in March 1942, the antiaircraft suite was augmented with a 1.1-inch quad mount fore and aft. Single 20mm mounts were added in groups of four on the bridge and on the aft superstructure. The Mk 3 fire-control radar was added fore and aft for the main battery and most ships received SC radar.

In the mid-war period, the 1.1-inch quad mounts were replaced by twin 40mm mounts and a third twin 40mm mount replaced a 3-inch/50 mount on the centerline. The two centerline 3-inch/50 mounts were moved amidships making the 3-inch/50 battery eight guns. The number of 20mm single mounts rose to ten or 12. Radars were modernized with the addition of SG for surface search, one on each mast, and the SK radar fitted on the mainmast for air search.

The final standard antiaircraft fit in 1945 was eight 3-inch/50 single guns, three 40mm twin mounts and 12 20mm single mounts. The SK radar was moved to the foremast, the two SG radars were retained, as were the two Mk 3 fire-control radars. Some ships had their torpedo tubes removed to save weight. There were exceptions. *Cincinnati* had her torpedo tubes removed and replaced by single 40mm guns. *Memphis* had seven 3-inch/50s and two twin 40mm mounts. *Detroit* had two forward upper casemate 6-inch guns removed and replaced by twin 40mm for a total of five twin 40mms and eight 3-inch/50 mounts.

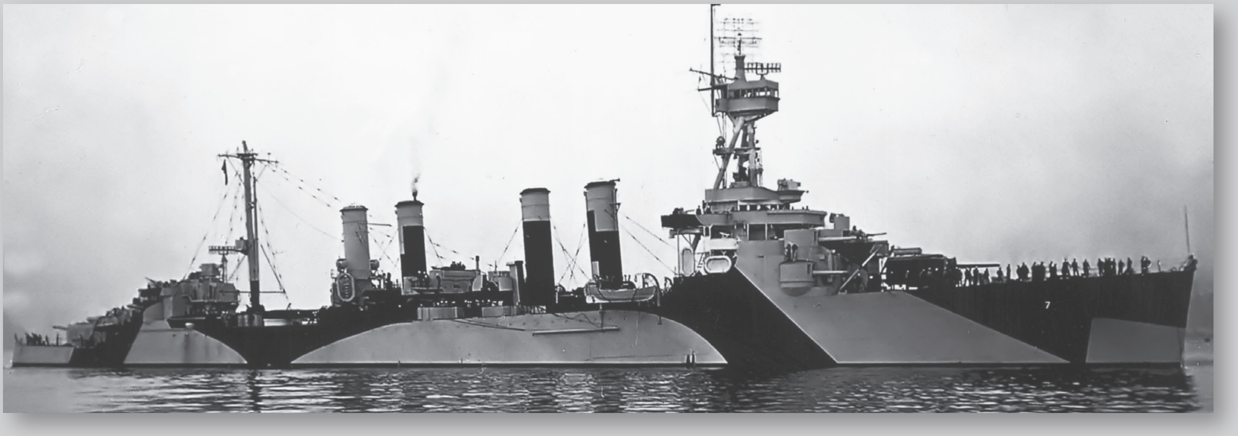
Omaha-Class Specifications	
Displacement	7,100 tons standard; 8,960 tons full load; by 1944 10,243 tons full load
Dimensions	Length 555ft, 6in overall; Beam 55ft 4in; Draft 15ft
Speed	35kts
Range	6,400nm at 15kts
Crew	458

Brooklyn Class

Design and construction

The Brooklyn class was a direct result of the London Naval Treaty of 1930. It was also the most important USN cruiser design in the period leading up to World War II. The new class was clearly the best cruiser design produced by the USN to date, including all previous Treaty heavy cruisers, and it introduced several new features which were continued on almost all USN light and heavy cruisers. The Brooklyns were the jumping-off point for the last Treaty heavy cruiser, the single-ship Wichita class, which was the basis for the subsequent Baltimore class of heavy cruisers, the largest class of heavy cruisers ever built. The Brooklyns were also the design basis for the next class of light cruisers, the Cleveland class, which was the largest class of light cruiser ever built.

The first four Brooklyns were ordered in August 1933 as part of the National Industrial Recovery Act which allowed warship construction with public works funds. The next three were ordered in August 1934, and the



Raleigh in May 1944 after completing her refit and modernization period. This view shows the ship's modified forward superstructure with a new bridge. Note the 40mm twin mount abaft the forward twin 6-inch mount. Much of the ship's electronics suite is on display including an SK air search radar on the foremast, an SG surface search radar on top of the pole mast, and a Mk 3 fire-control radar for the main battery located just forward of the SK. The ship is in an Ms 32/1d dazzle scheme.

OMAHA-CLASS WARTIME SERVICE

When the USN entered World War II, the Omaha class cruisers were well past their prime. They were no longer suited for operating with the main battle fleet and never did so during the war. Few saw front-line duty, and when they did this was in secondary areas like the Aleutians. Their speed and relatively good endurance made them suited for convoy escort and patrol duties. Many were employed in the South Atlantic looking for German surface raiders or blockade runners. By the end of the war, most were assigned training duties, and were quickly decommissioned at war's end.

Omaha had an active career which was entirely spent in the Atlantic and Mediterranean theaters. She began the war on the so-called Neutrality Patrol in the Atlantic and continued this into 1944. In January 1944, she intercepted two German blockade runners off South America. The highlight of her wartime career was the invasion of southern France in August 1944 during which she was part of the bombardment force.

Milwaukee had a largely uneventful career on patrol duty mostly in the South Atlantic until 1944 when she was selected to be part of an American-British naval package to the Soviet Union. *Milwaukee* escorted a convoy to northern Russia and on April 20, 1944, became a member of the Soviet Navy. She was renamed *Murmansk*, but was largely inactive until 1949 when she was returned to the USN.

Cincinnati left the Pacific before Pearl Harbor and spent her entire career in the Atlantic and Mediterranean. She escorted convoys to the United Kingdom and moved into the Mediterranean in mid-1944. Before being decommissioned in November 1946, she conducted two midshipmen cruises.

Raleigh was present at Pearl Harbor on December 7, 1941. A single torpedo hit in a forward boiler room nearly caused the ship to capsize. In the second wave, she was hit by a 550-pound bomb from a Japanese dive-bomber which struck below the waterline and passed through the ship's lightly armored hull to explode outside. Despite this damage, which would had been fatal had it been incurred on the open sea, the cruiser was repaired locally and was operational by mid-February 1942. After refit, the cruiser was assigned to the North Pacific where she participated in the recapture of the Kiska and Attu Islands. In January 1945, she conducted a diversionary raid on the Kurile Islands.

Detroit was the most active ship of her class. She was also present at Pearl Harbor on December 7, but was undamaged. She assumed convoy escort duties and thereafter spent from late 1942 to 1944 in the Aleutians. From February 1945, she was the flagship of the replenishment forces assigned to service the Fast Carrier Force. This kept *Detroit* active until the end of the war and she was the only Omaha-class cruiser present at the September 1945 surrender ceremonies in Tokyo Bay.

Richmond operated in the Atlantic on escort and patrol duties until January 1943 when she deployed to the Aleutians. On March 27, 1943, *Richmond*, the heavy cruiser *Salt Lake City,* and four destroyers engaged a superior Japanese force in the battle of the Komandorski Islands. In a prolonged gunnery duel in which *Richmond* shot 271 6-inch rounds, neither side scored a knock-out blow, but the Japanese intent to get a supply convoy through to Attu was thwarted. *Richmond* was undamaged in this action and spent the remainder of the war on patrol duty.

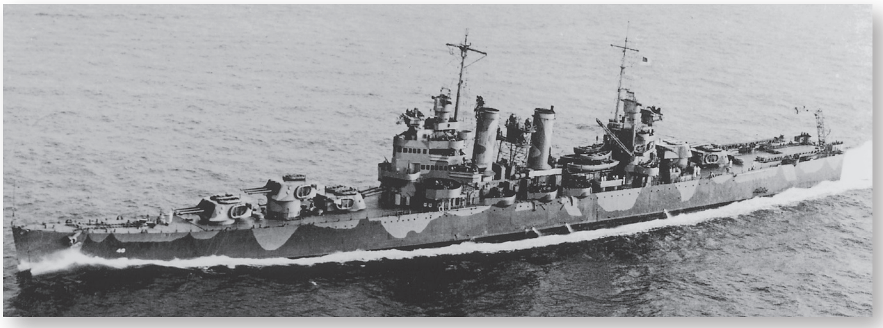
Concord was also active in the North Pacific. At the beginning of the war, she conducted convoy escort duties in the South Pacific, followed by most of 1943 in the South Atlantic. In April 1944, she began operations in the North Pacific which included raids against the Kurile Islands.

Trenton had a wartime career similar to *Concord*, beginning the war in the South Pacific, and then moving to the South Atlantic from mid-1942 to mid-1944. In September 1944, *Trenton* moved to the North Pacific.

Marblehead was assigned to the Asiatic Fleet at the start of the war. She missed the battle of Balikpapen in January 1942 due to engine problems, and on February 4, was bombed by Japanese aircraft. Two direct hits aft and several near-misses caused severe flooding which almost sank the ship. She was forced to return to the United States for repairs. After returning to service, she operated in the South Atlantic until early 1944 when she escorted a convoy to northern Russia. In July she moved into the Mediterranean and took part in the invasion of southern France in August. *Marblehead* spent the remainder of the war on training duties.

Memphis spent the majority of the war in the South Atlantic until entering the Mediterranean in early 1945.

Brooklyn shown in May 1942 in an Ms 12 scheme. By the end of the year, she would be in action off North Africa. The cruiser spent her entire wartime career in the Mediterranean and the Atlantic.



final two in October and September 1935. The last two ships were built to a modified design and are often identified as the Helena class.

Design work for the new class began in the fall of 1930 after the ratification of the London Treaty. Several schemes were considered between a maximum of 10,000 tons and a minimum of 6,000 tons and, in June 1931, a design of 9,600 tons was approved by the Secretary of the Navy. Because funding from Congress was not available to start construction, design development continued. Early in 1933, the IJN announced the characteristics of its new Mogami-class light cruiser with a main battery of 15 6.1-inch guns. The USN was now forced to re-cast the design of its new light cruiser to match this. The previous 12-gun design was seen as a balanced design, but to match the 15-gun Japanese design, some compromises would have to be made in the area of protection. The USN's desire to place enough armor on the new cruiser to withstand 8-inch shells at specific ranges was now impossible, and it was forced to settle for a cruiser armored against 6-inch gunfire.

The final design was a good balance of offensive power, protection, and speed. The main battery comprised 15 6-inch guns with an antiaircraft battery of eight 5-inch guns. Protection was assessed to be adequate against 6-inch gunfire, and the maximum speed of 32.5 knots was seen as adequate for all fleet duties.

Getting all this in a 10,000-ton hull required many weight-saving measures. Longitudinal framing was introduced to save weight. Some parties criticized the new cruisers as too lightly built in an effort to save weight by compromising on structural integrity. By all accounts, the cruisers possessed good seakeeping characteristics and were good gun platforms.

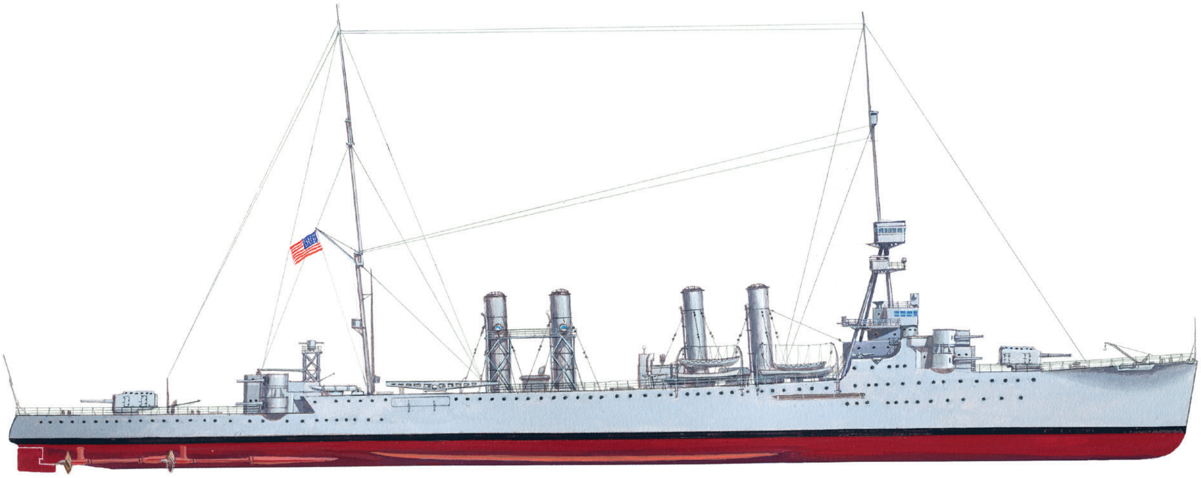
B

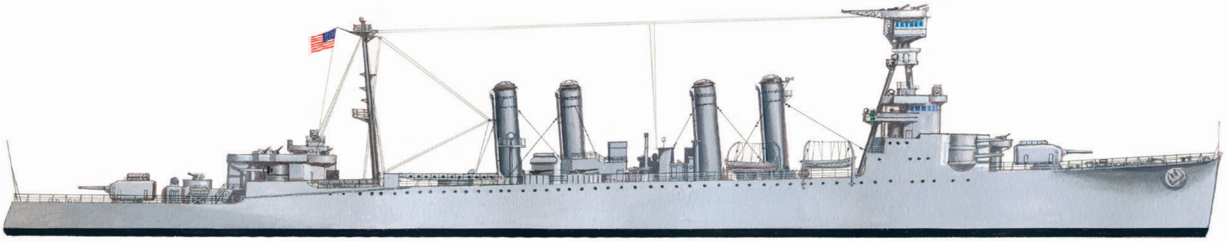
THE OMAHA CLASS

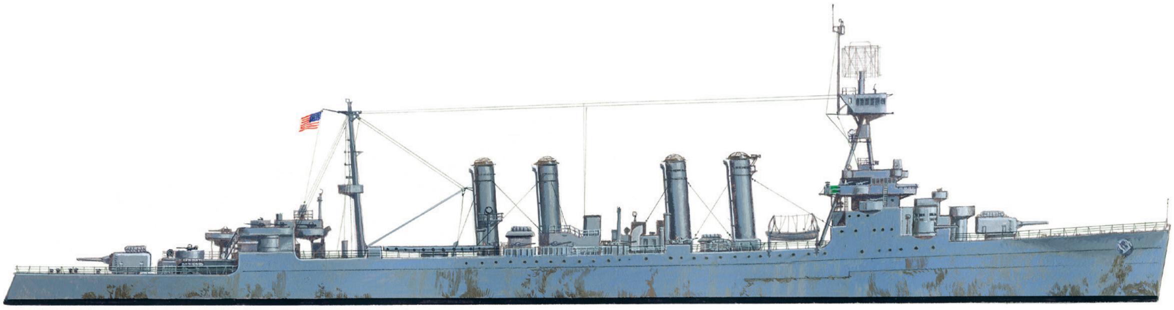
The top profile depicts *Omaha* as she was completed. The ship's appearance was distinctive because of its tall masts, four slim stacks, and forward and aft clusters of 6-inch guns. The set of hull-mounted torpedo tubes and the bottom casemate gun in the aft superstructure were found to be unworkable and were soon removed.

In the middle profile, *Raleigh* is shown as she appeared at the time of the Pearl Harbor raid. The ship retains its distinctive and archaic appearance, but has received an enhanced antiaircraft battery of 3-inch guns and eight heavy machine guns.

The bottom view of *Detroit* shows the late-war configuration of this class. A full radar suite of an SK set on the foremast and two SG sets on the top of both masts is evident. The antiaircraft battery has been augmented to eight 3-inch guns and five twin 40mm mounts, with 12 20mm single mounts. *Detroit* is in the Measure (Ms) 21 camouflage scheme. This all-navy-blue scheme was developed to provide maximum concealment from aerial observation.



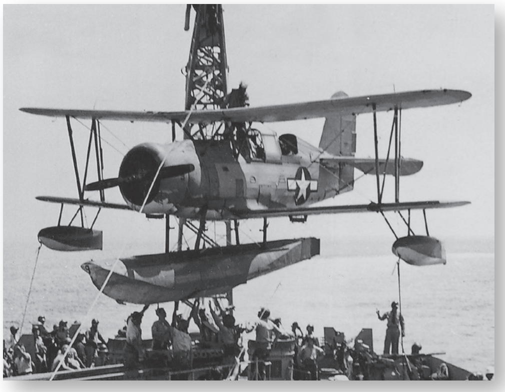




Brooklyn-Class Construction					
Ship	**Built at**	**Laid down**	**Launched**	**Commissioned**	**Fate**
Brooklyn (CL40)	New York Navy Yard	Mar. 12, 1935	Nov. 30, 1936	Sep. 30, 1937	Sold to Chile in 1951 and renamed *O'Higgins*; sold for scrap in 1992
Philadelphia (CL41)	Philadelphia Navy Yard	May 28, 1935	Nov. 17, 1936	Sep. 23, 1937	Sold to Brazil in 1951 and renamed *Barroso*; scrapped in 1974
Savannah (CL42)	New York Shipbuilding, Camden, New Jersey	May 31, 1934	May 8, 1937	Mar. 10, 1938	Scrapped, 1966
Nashville (CL43)	New York Shipbuilding	Jan. 24, 1935	Oct. 2, 1937	Jun. 6, 1938	Sold to Chile in 1951 and renamed *Capitan Prat* and later *Chacabuco*; scrapped, 1985
Phoenix (CL44)	New York Shipbuilding	Apr. 15, 1935	Mar. 13, 1938	Oct. 3, 1938	Sold to Argentina in 1951 and renamed *Desiete de Octubre* and later *General Belgrano*; sunk by RN submarine *Conqueror* on May 3, 1982
Boise (CL47)	Newport News	Apr. 1, 1935	Dec. 3, 1936	Aug. 12, 1938	Sold to Argentina in 1951 and renamed *Nueve de Julio*; scrapped, 1983
Honolulu (CL48)	New York Navy Yard	Sep. 10, 1935	Aug. 26, 1937	Jun. 15, 1938	Scrapped, 1959
St. Louis (CL49)	Newport News	Dec. 10, 1936	Apr. 15, 1938	May 19, 1939	Sold to Brazil in 1951 and renamed *Tamandare*; sank in 1980 on way to breakers yard
Helena (CL50)	New York Navy Yard	Dec. 9, 1936	Aug. 27, 1938	Sep. 18, 1939	Sunk July 6, 1943

The design speed was achieved by four shafts driven by four turbines with power from eight boilers. The boilers were grouped ahead of the engine room. More effective would have been an arrangement in which the placement of boilers and turbines was alternated so that a single hit could not knock out all propulsive power. The system provided a total of 100,000shp.

The protection scheme was superior to other nations' light cruisers of the period. The main belt was 5⅝ inches, with armored bulkheads of 2–5 inches at the end of the belt. Internal protection of the magazines included a 2-inch longitudinal belt. Horizontal protection comprised a 2-inch thick armored deck; the turret barbettes received 6 inches. The 6-inch turrets received 6.5 inches on their faces and 2 inches on their roofs. The conning tower was protected by 5 inches of armor. The total weight of armor was 1,798 tons, or 15 percent of the design standard displacement.



The Brooklyn class was the first USN cruiser to move its aviation facilities to the ship's stern. Shown here is a Curtiss SOC Seagull floatplane being brought aboard *Brooklyn* in June 1944. The single crane and two catapults are evident, but the aircraft are stored in a hangar below deck. This had space for six aircraft, but only four were usually embarked. The stern placement of the ship's aviation facilities was retained for every remaining USN cruiser class since it had advantages from both damage control and gunnery perspectives. These outweighed the added difficulty of recovering aircraft over the stern and the potential for flooding in the large hangar area if the stern was damaged.

BROOKLYN-CLASS WARTIME SERVICE

The start of the war found *Brooklyn* on the Neutrality Patrol in the Atlantic. She spent her entire wartime career in the Atlantic and Mediterranean. Highlights included the invasion of North Africa in November 1942 where she engaged a Vichy French light cruiser. *Brooklyn* provided naval gunfire support to American ground troops at Sicily in July 1943, Salerno in September 1943, Anzio in January 1944, and southern France in August 1944. The cruiser was decommissioned in 1947, and then sold to Chile in 1951.

Philadelphia also spent her entire wartime career in the Atlantic theater. She participated in the invasion of North Africa and supported the invasions of Sicily and Salerno. After a refit, she returned to action off Anzio from February to May 1944 and then supported the invasion of southern France. *Philadelphia* was decommissioned in 1947, and then sold to Brazil in 1951.

Savannah was the last of her class to spend her entire wartime career in the Atlantic theater. Her first combat action was during the invasion of North Africa. This was followed by blockade runner patrols in the Central and South Atlantic. She was present at Sicily, and also at Salerno where on September 11, 1943 she was struck by a German PC 1400FX radio-controlled bomb launched from a Do-217 bomber. The bomb and its 700 pounds of explosives did great damage. It penetrated the roof of turret number 3 and exploded in the magazine which blew out the bottom of the ship causing extensive flooding and severe casualties (197 dead and 15 wounded). The flooding prevented the ship from being lost in a magazine explosion, but it also marked the end of her wartime career. Repairs took from December 1943 until September 1944. After re-entering service, she was used for training until the end of the war. Decommissioned in 1947, she was stricken in 1959 and scrapped in 1966.

Nashville began the war in the Atlantic, but was quickly shifted to the Pacific and took part in the Doolittle Raid in April 1942. This was followed by duty in the North Pacific which forced her to miss almost the entire Guadalcanal campaign. She shelled several Japanese positions in the Central Solomons before suffering a magazine explosion on May 12, 1943 which kept her out of action until August. For the remainder of the war, *Nashville* served in the 7th Fleet and participated in a number of amphibious invasions including New Guinea, the Philippines and the NEI. Her only wartime damage came on December 13 during the invasion of Mindoro in the Philippines when she was struck by a kamikaze which killed or wounded 323 crew members. She was decommissioned in 1946 and sold to Chile in 1951.

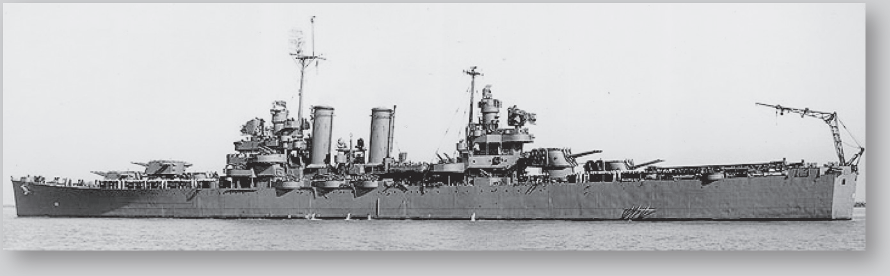
Phoenix was in Pearl Harbor on December 7, 1941 and emerged undamaged. The cruiser was sent to Australian waters and subsequently operated in the Indian Ocean and in NEI waters. She joined the 7th Fleet in 1943 and saw action off New Guinea. She was also present at the battle of Surigao Strait on October 25 before participating in the invasion of Luzon in January 1945 and later of Borneo. After the war she was sold to Argentina. She has the dubious distinction of being the only ship ever sunk in combat by a nuclear-powered submarine when the Royal Navy's *Conqueror* sank her with two torpedoes in May 1982 during the Falklands Conflict.

Boise was assigned to the Asiatic Fleet at the start of the war. Probably fortunately for her crew, the ship went aground on January 21, 1942 and the cruiser missed the desperate and unsuccessful defense of the NEI. Back in service she took part in the invasion of Guadalcanal in August 1942 and was damaged at Cape Esperance in October. After repairs she transferred to the Mediterranean and took part in the invasions at Sicily and Salerno. She returned to the Pacific late in 1943 and participated in invasions on New Guinea, the Philippines and Borneo. *Boise* was decommissioned in 1946 and later sold to Argentina.

Honolulu was also present at Pearl Harbor on December 7. The cruiser missed most of the Guadalcanal campaign serving in the North Pacific, but was present at the battle of Tassafaronga in November 1942. She fought in the battle of Kula Gulf on July 5–6, 1943 and a few days later at the battle of Kolombangara, on July 11–12, she helped sink a Japanese light cruiser, but was hit by a torpedo on her bow. Another torpedo hit her stern, but failed to explode. She returned to service in November 1943 and saw action in the last part of the Solomons campaign, the invasion of the Marianas in June 1944, and the invasion of Leyte in October. On October 20, 1944, she was hit by an air-launched torpedo which caused heavy damage and ended her wartime career. *Honolulu* was decommissioned in 1947 and sold for scrap in 1959.

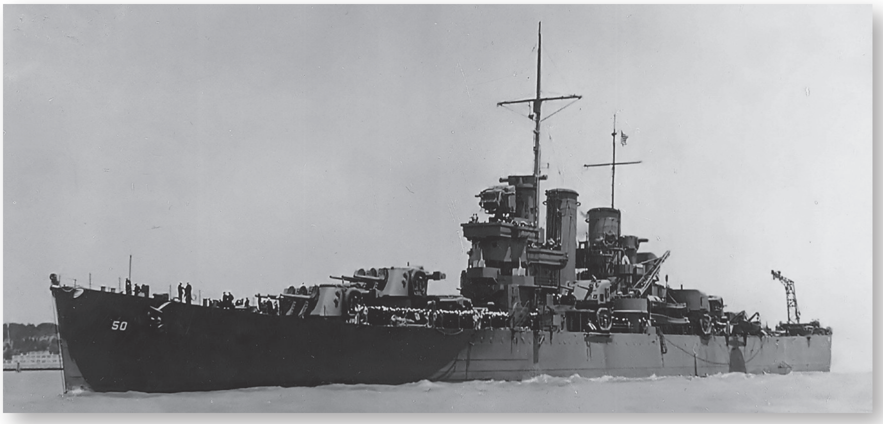
St. Louis was present at Pearl Harbor on December 7 but was undamaged. This was followed with carrier and convoy escort duties, and then operations in the North Pacific. She served in the last phases of the Guadalcanal campaign. She was present at Kula Gulf and then Kolombangara where she was hit by a torpedo on her bow. This placed her out of service until November. After her return, she was active in the last phases of the Solomons campaign, and on February 14, 1944 was hit by one bomb and three near-misses which killed 23 and wounded 28. After repairs she took part in the invasion of Saipan in June 1944. After a refit she returned to action in mid-November, but two kamikazes hit her aft on November 27 which killed 16 and wounded 21 and forced her out of action until March 1945. After repairs she participated in the carrier raids of Japan and the Okinawa campaign. *St. Louis* was decommissioned in 1946 and sold to Brazil in 1951.

Helena had a brief but eventful wartime career. She was present at Pearl Harbor on December 7 and was badly damaged by a single torpedo. After repairs she took part in the Guadalcanal campaign and saw action in several engagements. At Cape Esperance, she helped sink a Japanese heavy cruiser and destroyer with a barrage of 6-inch gunfire. *Helena* was present at Santa Cruz and at the First Naval Battle of Guadalcanal. At Kula Gulf, she was sunk by three torpedoes with the loss of 168 men.



Nashville in August 1943 showing her mid-war configuration. Two 40mm quad mounts can be seen on her port side, along with the original 5-inch/25 single mounts. An SK radar is on the foremast.

This port bow view of *Helena* in 1943 shows the ship in her final configuration. An open bridge has been fitted and a 40mm quad mount can be seen amidships. The SC radar on the foremast has been deleted by the censors. The ship is in an Ms 21 scheme.



The Brooklyn class introduced the aft placement of aviation facilities. This had the effect of making it easier to recover aircraft, not interfering with the placement of guns amidships, and improving resistance to battle damage since the aircraft and their fuel were located away from vulnerable areas. Two catapults were fitted aft, supported by a single crane on the fantail, and up to four aircraft could be stored in the hangar which was below deck.

The last two ships in the class, *St. Louis* and *Helena*, were built to a modified design. The most important and obvious difference was the substitution of the 5-inch/38 gun for the 5-inch/25. As early as 1936, the USN was convinced of the superiority of the 38-caliber gun and sought to add it to the later Brooklyn-class ships in spite of the additional weight of the newer weapon. The last two ships were fitted with four of the Mk 29 mounts which was the USN's first 5-inch/38 twin mount.

The last two ships also had different internal machinery arrangements. There were two engine rooms and two boiler rooms; this augmented compartmentation increased the ships' resistance to battle damage and was made possible by the adoption of smaller boilers which took up less space.

Armament

The main battery comprised five triple 6-inch turrets with turrets two and four in a super-firing position. The antiaircraft battery was eight 5-inch/25 single mounts fitted four along each beam. Eight .50-caliber machine guns were added for protection against dive-bombers. No torpedoes tubes were fitted. The final two ships substituted eight 5-inch/38 guns in twin mounts for the eight single 5-inch/25 mounts.

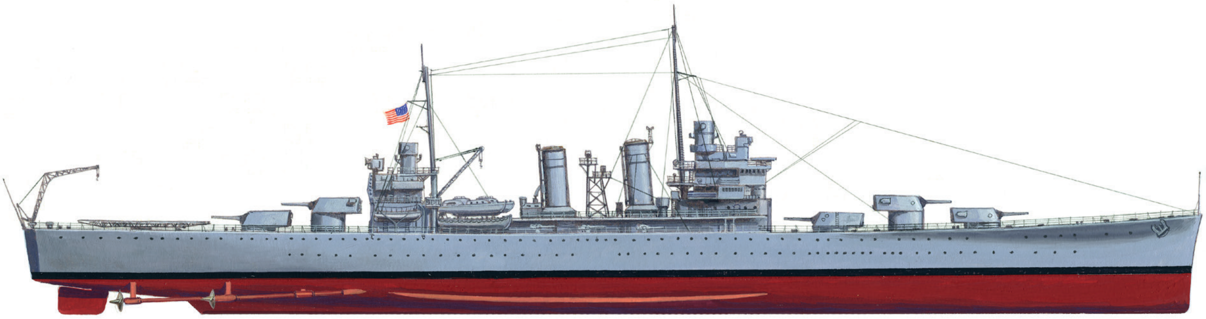
C

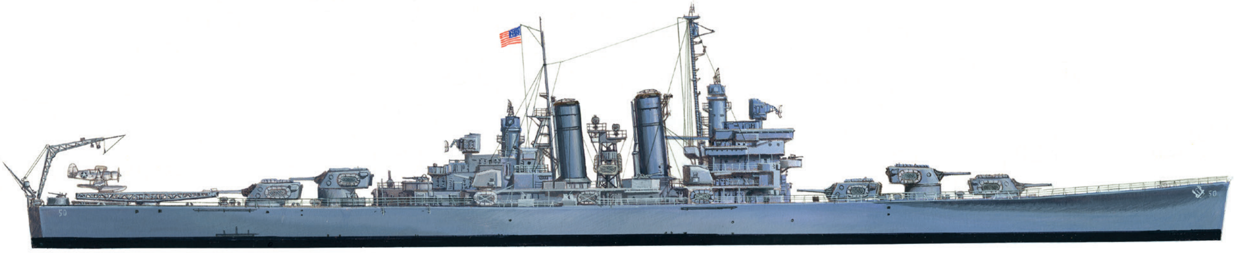
THE BROOKLYN CLASS

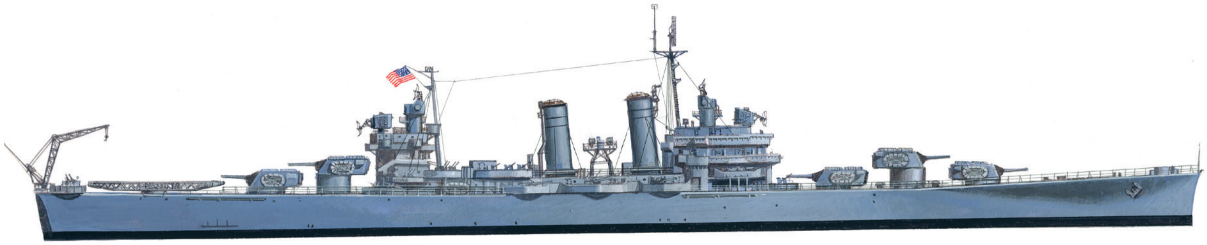
The top profile depicts *Honolulu* in her early-war configuration at Pearl Harbor. The Brooklyn class was a powerful and balanced design, as can be seen here, with a heavy main battery of 15 6-inch guns in five triple turrets. For the first time on a USN cruiser, the aircraft facilities were moved aft.

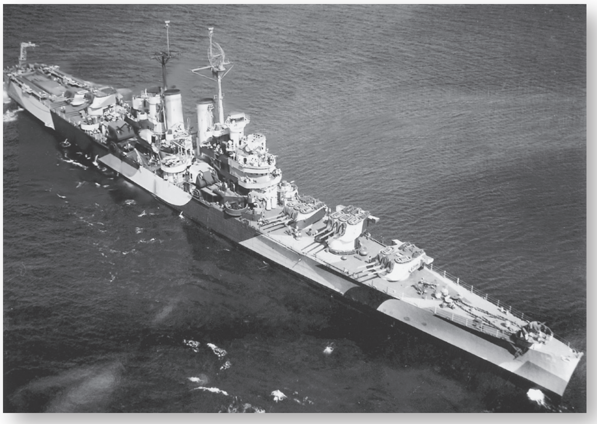
The middle profile shows *Helena* at the time of her loss in July 1943. *Helena* was one of the two ships of a sub-class of the Brooklyn class with the primary difference being the adoption of twin 5-inch/38 mounts for the 5-inch/25 single mounts. Already by mid war, light cruisers had a number of search and fire-control radars as evident on *Helena*. The antiaircraft battery has also been upgraded with four 40mm quad mounts and a number of single 20mm single guns.

Nashville is the subject of the bottom profile. This is a Brooklyn-class cruiser in its late-war configuration. The ship retains its 5-inch/25 battery, but shows the final Brooklyn class fit of four quad and six twin 40mm mounts.









St. Louis in her late-war configuration in October 1944. The forward superstructure has been rebuilt. Details are obscured by the Ms 32/2c dazzle scheme, but two quad and two twin 40mm mounts can be seen on the starboard side. An SK-2 radar is fitted on the foremast and SG sets are on top of both pole masts.

Service Modifications

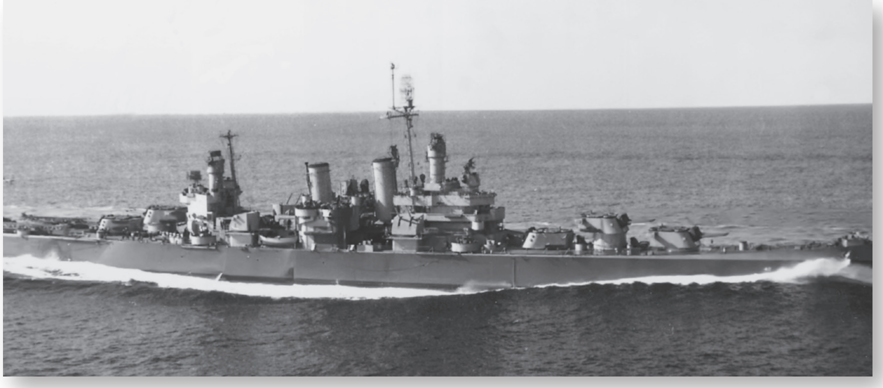
Before the United States joined World War II, it was intended to augment the ships with four quad 1.1-inch mounts. This proved impossible because of shortages, so the plan was adjusted to two quad 1.1-inch mounts and two 3-inch guns. Only *Helena* was given these before the war. Once fitted, the 3-inch guns remained on some ships well into the war; *Phoenix* kept hers until early 1943.

Early-war modifications were limited to a few additional 20mm guns. These were placed around the conning tower and amidships. The starboard boat crane was removed to save weight. Most ships received an early form of an open bridge as a fire-control station for antiaircraft defense.

In the mid-war period, all surviving ships had their bridges radically altered. The bridge was cut down a level and a new open bridge built on top as a fire-control platform. This also served to reduce top weight, as did the removal of the armored conning tower.

A pair of twin 40mm guns was fitted on the new forward superstructure and another pair placed forward on the main deck abeam the new conning tower. In late 1942, the standard Brooklyn-class antiaircraft battery was set at four twin and four quad 40mm mounts.

Savannah was reconstructed after her encounter with a German guided bomb off Salerno. The hull was blistered up to the main deck and the ship's appearance changed with a simplified bridge. The single 5-inch/25 guns were removed and four twin 5-inch/38 mounts added. Mk 37 dual-purpose directors replaced the Mk 33. Four quad 40mm mounts were placed on towers amidships and six twin 40mm in pairs placed abreast the bridge and the aft superstructure, and on the fantail. This was the modification planned for all the Brooklyns in the course of major overhauls or as a result of battle damage. This proved impossible to carry out, although *Brooklyn*, *Philadelphia*, and *Honolulu* were blistered, but not re-armed. By end of the war, all ships except *Honolulu* were fitted with four quad and six twin 40mm mounts and ten twin 20mm mounts (*Nashville* had nine), but all but *St. Louis* and *Savannah* retained single 5-inch/25 guns. The table at the top of the next page shows the armament of various ships in the class at representative stages of the war.



Following her extensive damage off Salerno, *Savannah* was rebuilt. This is the cruiser in October 1944. The 5-inch/38 twin gun mounts are evident, as are the two 40mm quad mounts amidships; there are also twin 40mm mounts abeam the rebuilt forward and aft superstructures and the fantail. Despite plans to rebuild the entire class in this manner, *Savannah* was the only ship to receive this degree of modernization.

Wartime Modifications to Brooklyn-Class Light Cruisers

	6-inch/47	5-inch/25	5-inch/38	40mm	1.1-inch/3-inch	20mm
Brooklyn (12/41)	15	8	0	0	0	0
Philadelphia (1/44)	15	8	0	20 (6 x 2, 2 x 4)	0	18
Savannah (9/45)	15	0	8 (4 x 2)	28 (6 x 2, 4 x 4)	0	12 twin
Nashville (1945)	15	8	0	28 (6 x 2, 4 x 4)	0	9 twin
Boise (3/43)	15	8	0	16 (4 x 4)	0	28 single
St. Louis (10/43)	15	0	8	20 (2 x 2, 4 x 4)	0	18–20 single
St. Louis (8/45)	15	0	8	28 (6 x 2, 4 x 4)	0	9 single
Helena (1/41)	15	0	8	0	2 quad 1.1-inch, 2.3-inch	0
Helena (6/42)	15	0	8	16 (4 x 4)	0	12 single

Brooklyn-Class Specifications (as built)

Displacement	9,767 tons standard; 12,207 tons full load
Dimensions	Length 608ft 4in overall; Beam 61ft 9in; Draft 22ft 9in
Speed	32.5kts
Range	10,000nm at 15kts
Crew	868

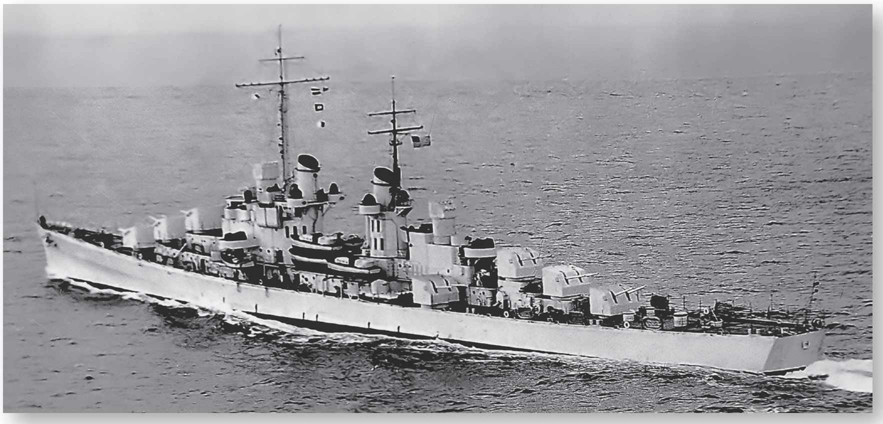
Atlanta Class

Design and construction

Under the 8,000-ton restriction of the 1936 London Naval Treaty, several different designs were considered for the USN's new small cruiser. One was a 3,000–3,500-ton flotilla leader with a mixed battery and no protection, the second was a 5,000–5,500-ton cruiser with a mixed battery and protection sufficient against 5-inch gunfire, and the last was a 7,500–8,000-ton design with a mixed battery of 12 6-inch and eight 5-inch guns, aircraft facilities and protection against 6-inch shells. From the beginning, a mixed battery was not favored on such a small hull. When it was apparent that the 6-inch dual-purpose mount would not be ready in time, this left a design centered on the existing twin 5-inch/38 mount. The preliminary design for the new cruiser was completed in July 1938 and resulted in a 6,000-ton ship with a battery of

Atlanta-Class Construction

Ship	Built at	Laid down	Launched	Commissioned	Fate
Atlanta (CL51)	Federal Shipbuilding, Kearny, New Jersey	Apr. 22, 1940	Sep. 6, 1941	Dec. 24, 1941	Sunk November 13, 1942
Juneau (CL52)	Federal, Kearny	May 27, 1940	Oct. 25, 1941	Feb. 14, 1942	Sunk November 13, 1942
San Diego (CL53)	Bethlehem, Quincy	Mar. 27, 1940	Jul. 26, 1941	Jan. 10, 1942	Scrapped, 1960
San Juan (CL54)	Bethlehem, Quincy	May 15, 1940	Sep. 6, 1941	Feb. 28, 1942	Scrapped, 1962
Oakland (CL95)	Bethlehem, San Francisco	Jul. 13, 1941	Oct. 23, 1942	Jul. 17, 1943	Scrapped, 1960
Reno (CL96)	Bethlehem, San Francisco	Aug. 1, 1941	Dec. 23, 1942	Dec. 28, 1943	Scrapped, 1962
Flint (CL97)	Bethlehem, San Francisco	Oct. 23, 1942	Jan. 25, 1944	Aug. 31, 1944	Scrapped, 1966
Tucson (CL98)	Bethlehem, San Francisco	Dec. 23, 1942	Sep. 3, 1944	Feb. 3, 1945	Scrapped, 1971
Juneau (CL119)	Federal, Kearny	Sep. 15, 1944	Jul. 15, 1945	Feb. 15, 1946	Scrapped, 1962
Spokane (CL120)	Federal, Kearny	Nov. 15, 1944	Sep. 22, 1945	May 17, 1946	Scrapped, 1973
Fresno (CL121)	Federal, Kearny	Feb. 12, 1945	Mar. 5, 1946	Nov. 27, 1946	Scrapped, 1966



This is *Atlanta* as she was completed in December 1941. The graceful appearance of the class is evident with its symmetrical main battery and two evenly spaced stacks. Note the waist 5-inch/38 mounts. The ship is devoid of radar and carries only three 1.1-inch quad mounts for close-range antiaircraft protection.

5-inch/38 guns. The first four ships were ordered in April 1939 and the second group ordered in September 1940. Because of the modifications made to the second and third groups, these are often referred to as the Oakland class.

Protection was light and totaled only 585.5 tons of armor. The main belt was a maximum of 3.75 inches over the machinery spaces and more shallow forward and aft over the magazines. The belt was closed off by 3.75-inch armored bulkheads. The armored deck was a thin 1.25 inches and 2.5 inches of armor were devoted to the conning tower. The gun houses and handling rooms were provided with 1.25 inches of armor.

The design speed of 32.5 knots was achieved with a power plant capable of producing 75,000shp. In order to achieve a higher speed to operate with destroyers, no protection could have been provided. The cruisers were fitted with high-pressure/high-temperature steam plants with alternating boiler and engine rooms. On sea trials, *Atlanta* made 33.67 knots. Other ships made only 31 knots in wartime conditions.

The second group introduced modifications to the ships' armament. The primary difference was the removal of the two 5-inch/38 twin waist mounts. The final group of three ships incorporated war experience. By this point, their mission as antiaircraft cruisers was clear, so they were maximized for this role. The design was badly overweight, so measures were taken to improve stability by reducing the height of the main battery and simplifying and lowering the forward superstructure.

Armament

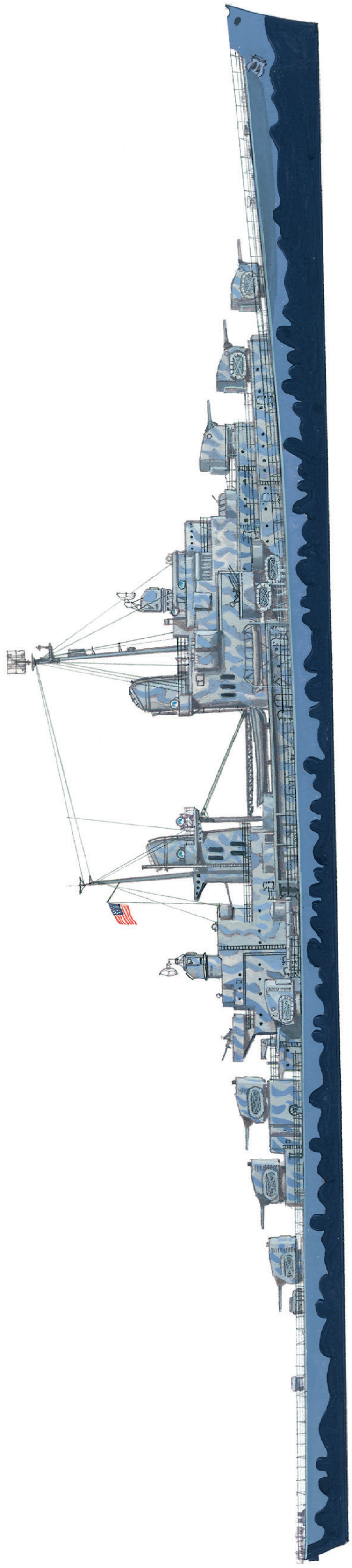
The first four units were given a main battery of eight 5-inch/38 twin mounts arranged in six on the centerline fore and aft and two on the waist aft.

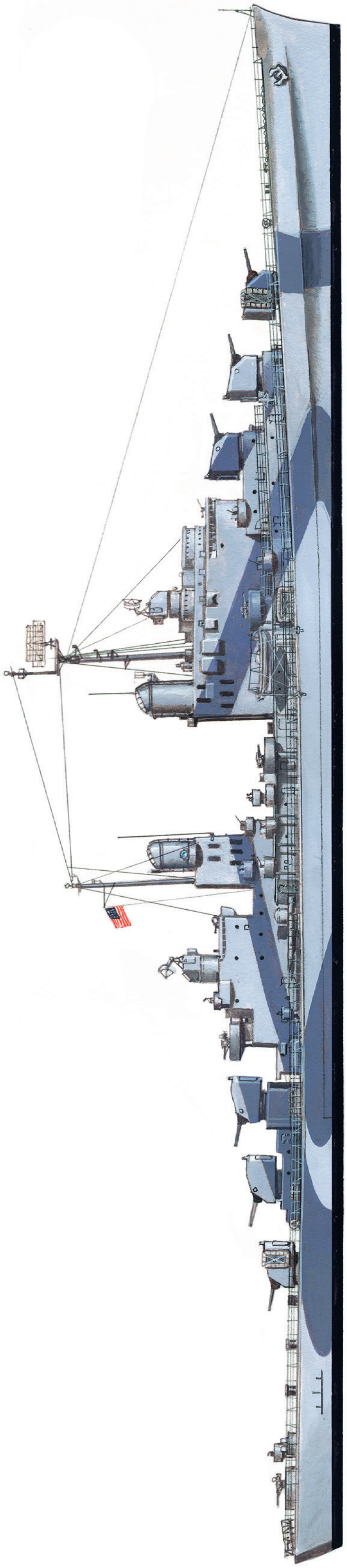
D

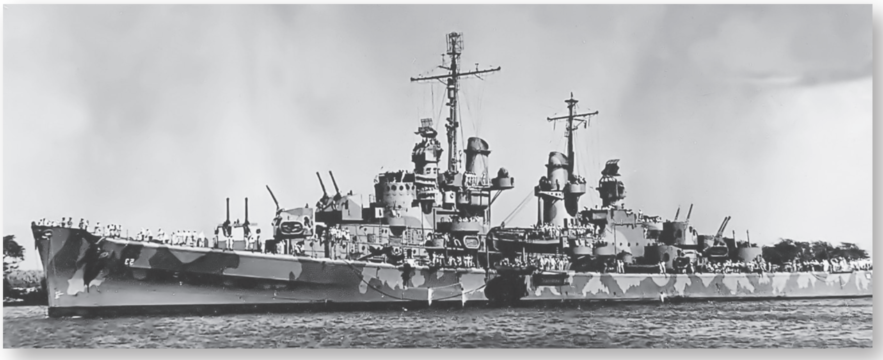
THE ATLANTA CLASS

The top profile depicts *Atlanta* in her early-war configuration. The ship is shown at the time of her loss off Guadalcanal in November 1942. The ship projects a graceful and balanced appearance. Note the lack of aviation facilities and the battery of 16 5-inch/38 guns in eight twin turrets on the original four ships. The ship is in her striking Ms 12 (modified) camouflage scheme. This was the most popular scheme during the early-war period and virtually every ship's design of splotches or mottled patterns was unique.

The bottom profile shows *Reno* in a late-war (November 1944) configuration. *Reno* was a member of the second group of Atlanta-class cruisers which were distinguishable by their main battery of six, vice eight, 5-inch/38 twin mounts. The cruiser also shows a battery of eight twin 40mm mounts and 16 single 20mm guns. The ship is wearing the Ms 31a/24d dazzle scheme.







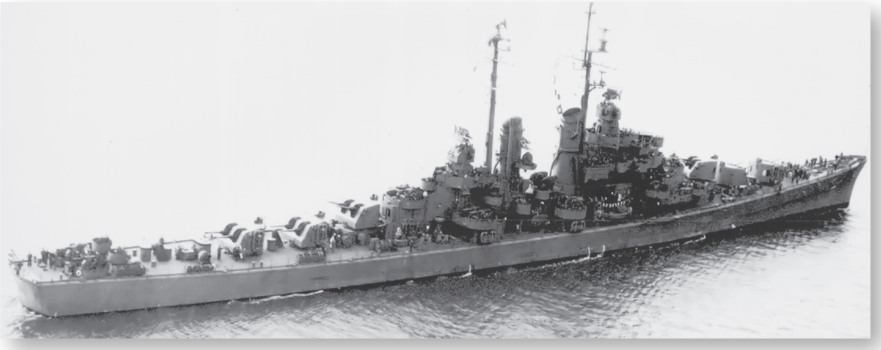
San Diego pictured in June 1942 at Pearl Harbor. The ship is wearing an Ms 12 (modified) scheme. The cruiser has already received an SC radar on its foremast and Mk 4 radars for its two Mk 37 directors. *San Diego* was one of the most successful cruisers in the Pacific War seeing action in almost every major operation from late 1942 until the end of the war without suffering any major battle damage. She earned 15 USN Battle Stars for her service.

The antiaircraft battery was originally set at three 1.1-inch quadruple mounts. In December 1941, this was upgraded to four 40mm twin mounts with 1.1-inch quads designated as interim replacements. Eight 20mm single guns were also fitted. Two quadruple torpedo tube mounts were fitted aft. Uniquely for a USN cruiser, antisubmarine equipment was also added including a hull-mounted sonar and two removable depth charge tracks. Later, six depth charge throwers were also fitted. In practice, even a small cruiser was not maneuverable enough to effectively employ these weapons against submarines and all were removed by late 1944.

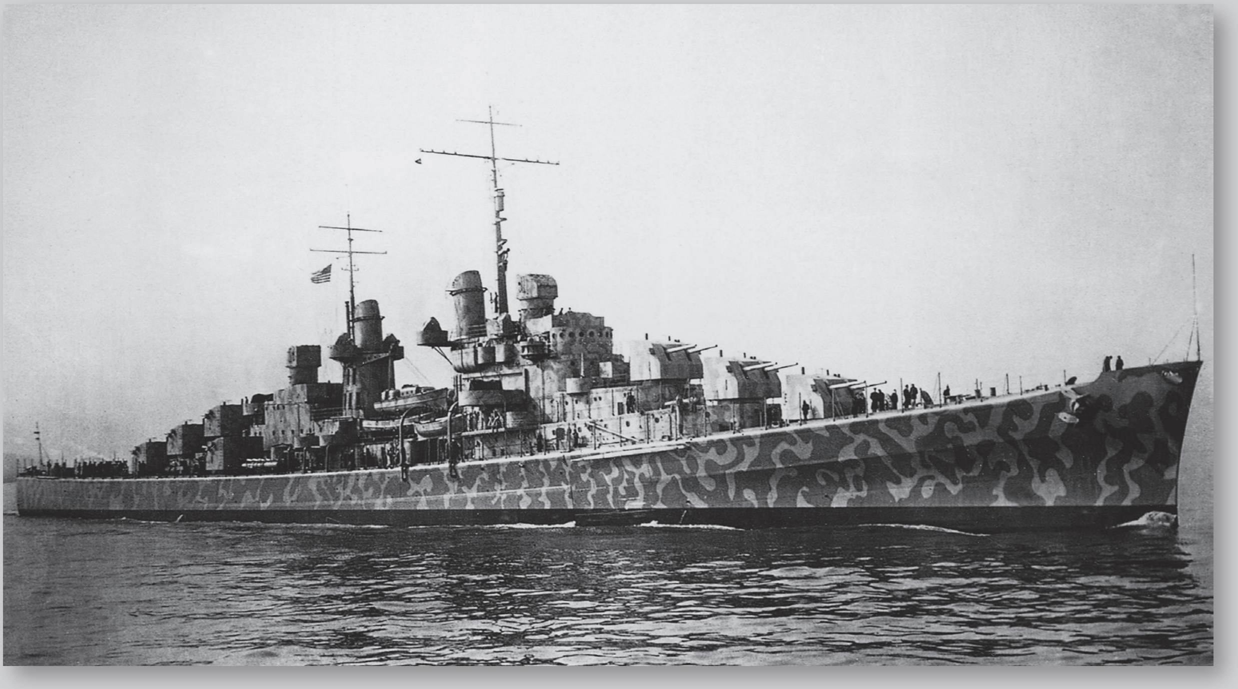
The second group had the two 5-inch/38 twin waist mounts removed to save weight, and these were replaced with 40mm twin mounts which gave them a total of eight. These ships also received 18 20mm single mounts. The third group was completed after the war so received all the upgrades given to earlier ships. These ships were fitted with the definitive armament of the class which totaled six 5-inch/38 twin mounts, six quad and six twin 40mm mounts, and eight twin 20mm guns. These ships were completed without torpedo tubes.

Service Modifications

In keeping with their wartime role as antiaircraft screening ships for carriers, this class received upgrades to its antiaircraft battery during the war. The first four units were completed with a rounded bridge which was closed. The lack of an open bridge was seen as a major disadvantage because it inhibited control of the antiaircraft guns against air attack. Early in the war an extemporized open bridge was fitted, and as the ships went into overhaul they were given a true open bridge. All later ships were completed with square, open bridges. To save weight, the conning tower was removed from later ships, as were the boat crane and all ship's boats.



The three ships of the third group of Atlanta-class cruisers were all completed after the war. This is *Juneau* in 1946. The ships retained the basic configuration of earlier ships in the class, but various changes were made to improve stability including reducing the height of the main battery which is evident in this view. The postwar electronics suite includes an SK-2 air search radar on the foremast and an SP fighter-direction radar on the mainmast.



Juneau wore two types of camouflage during her short career. In this early 1942 view, the ship is in an Ms 12 (modified) mottled scheme. The hull was later painted in a disruptive pattern of white, navy blue and ocean gray which she wore until her loss in November 1942. In this view, none of the ship's radars have been fitted.

ATLANTA-CLASS WARTIME SERVICE

The lead ship in the class had a brief career. *Atlanta* was assigned as a carrier escort and in this capacity was present at Midway and the two carrier battles of the Guadalcanal campaign – Eastern Solomons in August and Santa Cruz in October. As has already been recounted, *Atlanta* was sunk at the First Naval Battle of Guadalcanal on November 13, 1942.

Juneau had a brief career similar to *Atlanta*'s. She arrived in the South Pacific in September, and was present at Santa Cruz. She was also committed to the desperate attempt to protect the airfield on Guadalcanal on November 11–12 and was sunk on the 13th.

San Diego began her wartime career in the South Pacific and was present at Santa Cruz. Assigned to the Fast Carrier Force, she participated in almost every major engagement; the landings on the Gilberts in November 1943; the Marshalls in January 1944; the Marianas in June 1944 which also included the largest carrier battle of the war at Philippine Sea; the landings on Leyte in the Philippines in October 1944 which prompted the IJN's last major sortie resulting in the battle of Leyte Gulf; the carrier raids on Formosa in October, the Philippines in late 1944 and early 1945, followed by the Okinawa campaign in April 1945; and the carrier raids on Japan. *San Diego* was the first ship to enter Tokyo Bay after the Japanese surrender having fought through almost the entire war without suffering damage. She was decommissioned in 1946.

San Juan was operating off Guadalcanal during the disastrous battle of Savo Island in August 1942, but was not engaged in the action. At Santa Cruz, she was attacked by five Japanese dive-bombers. One scored a damaging near-miss on the port side and the last plane to attack placed a 550-pound hit on the cruiser's stern which passed all the way through the thinly armored ship before exploding under the hull. The damage was quickly contained and did not require a return to the United States for repair. For the remainder of the war, *San Juan* was assigned to carrier escort duty. The cruiser was decommissioned in 1946.

Oakland began her combat service in the Gilbert Islands invasion. She continued to be active with the fast carriers for the remainder of the war and, following the conclusion of hostilities, was retained in service for training duties until 1949 when she was decommissioned.

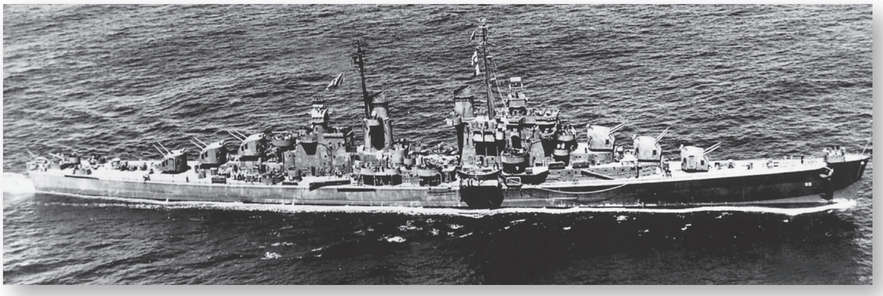
Reno did not begin her combat service until May 1944 so saw action at Philippine Sea. In October during the carrier raid on Formosa she was lightly damaged by a Japanese aircraft that crashed on her aft section after she had shot it down. On November 3, while covering the Leyte invasion, she was struck on her stern by a torpedo from IJN submarine *I-41*. She did not lose power, but the severe flooding almost caused the cruiser to capsize. Repairs were not concluded until after the war, and she was decommissioned in 1946.

Flint reached the combat area in December 1944 and was assigned to carrier escort duty. She served with the fast carriers through to the end of the war and was decommissioned in 1947.

Tucson was the last Atlanta-class unit to see combat, but only joined the Fast Carrier Force in June 1945. After being decommissioned in 1949, she did not return to service, but was used as an experimental hulk from 1966 to 1970 before being scrapped.

Juneau (named after the ship lost in 1942), *Spokane*, and *Fresno* were all completed after the war. *Juneau* served until 1956, including service in the Korean War, *Spokane* only served until 1950, and *Fresno* was decommissioned in 1949.

A fine beam shot of *Oakland* showing the basic configuration of the second group of Atlanta-class ships. The waist 5-inch/38 mounts have been removed, and the number of twin 40mm mounts increased to eight. The quadruple torpedo mounts aft have been retained. The ship is in an Ms 21 scheme.



The two surviving ships from the first group (*San Juan* and *San Diego*) were refitted in late 1943. A 40mm quad mount was placed on the fantail, and the three 1.1-inch quad mounts replaced with 40mm twins. The 20mm battery had been increased to 13 in October 1942. In 1945, these ships had 16 5-inch guns, one quad and five twin 40mm mounts, nine 20mm guns and their torpedo tubes.

In 1945, it was planned to give all ships in the second group modifications to deal with the kamikaze threat. The torpedo tubes and twin 40mm mounts located aft were removed and replaced by 40mm quad mounts. Another 40mm quad mount was placed on the aft superstructure in place of the twin 40mm mount already there and the 40mm quad mount on the stern remained. This translated to a final armament of 12 5-inch/38 guns, four quad and four twin 40mm mounts, and 16 20mm guns in eight twin mounts. Only *Oakland* received this refit before the end of the war. In January 1945, approval was given to remove the torpedo mounts; by the end of war, only *Flint* retained hers.

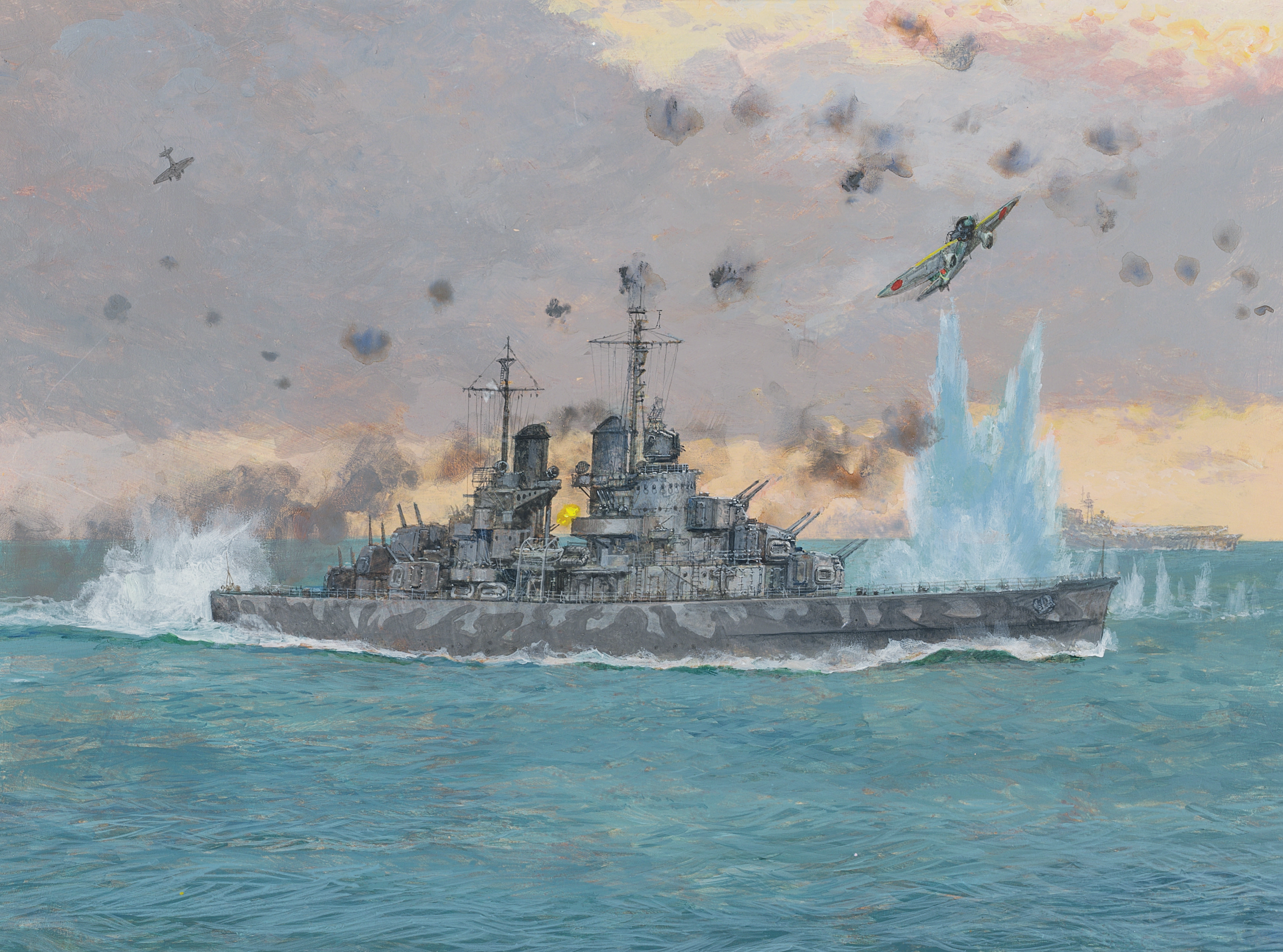
Electronics aboard the ships completed during the war also evolved. Earlier ships received only the SC-1, but later in the war surviving ships were given a standard fit of one SC-2 and two SG radars. Fire control for the main battery was performed by two Mk 37 directors with the original Mk 4 radar, later replaced with the Mk 12/22 radar combination.

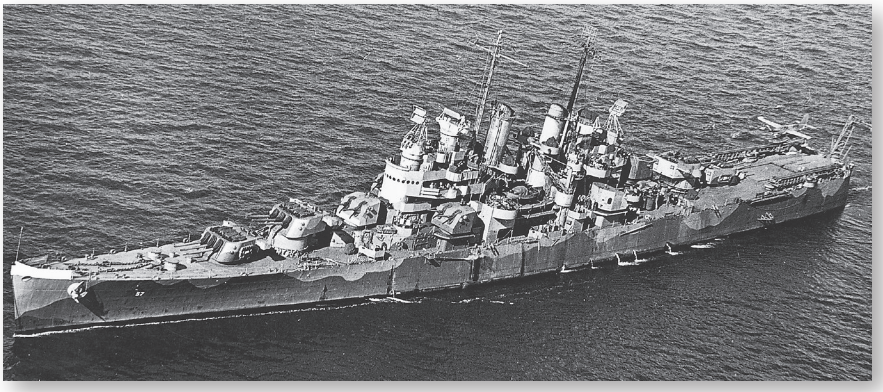
Atlanta-Class Specifications (as built)	
Displacement	6,718 tons standard; 8,340 tons full load
Dimensions	Length 541ft, 6in overall; Beam 53ft 2in; Draft 20ft 6in
Speed	32.5kts
Range	8,500nm at 15kts
Crew	623

E

SAN JUAN AT THE BATTLE OF SANTA CRUZ, OCTOBER, 1942

San Juan was assigned to escort carrier *Enterprise* at the battle of Santa Cruz on 26 October. Sister ships *San Diego* and *Juneau* were assigned to protect carrier *Hornet* which was operating in a separate task force. *Enterprise* came under air attack twice during the day. The second attack, mounted by 17 Type 99 "Val" dive-bombers from carrier *Junyo*, occurred just before noon. Low cloud prevented the Japanese from massing their attack on the carrier, and of the 17 dive-bombers, only eight attacked *Enterprise* with another four attacking battleship *South Dakota* and the last five *San Juan*. The first three bombers which attacked the light cruiser missed, but the next scored a damaging hit on the port side. The last placed a 550-pound armor-piercing bomb on *San Juan*'s stern. The bomb passed through the thinly armored ship before exploding under the hull. This resulted in the flooding of several compartments and temporarily jammed the rudder. None of the attacking aircraft was shot down by antiaircraft fire. *San Juan* is in a variation of the Ms 12 scheme. This camouflage scheme was designed to offer a measure of protection against both surface and air detection with some degree of course and range deception.





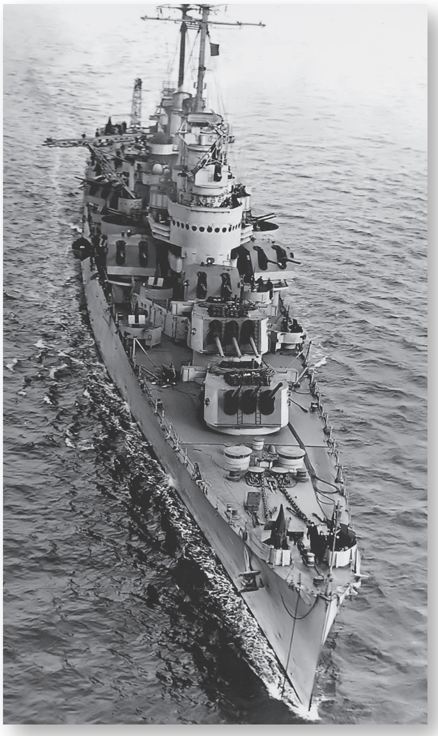
This photo is of *Montpelier* on October 27, 1942 shortly after her commissioning. This early-war configuration shows an SC radar on the mainmast and an SG on the foremast. Ship's boats are evident amidships; only one quad and one twin 40mm mount is visible on each beam. All Cleveland-class cruisers later had their boats removed to clear space for additional 20mm and 40mm guns. *Montpelier* is wearing an Ms 12 scheme which was common during the early-war period.

Cleveland and Fargo Classes

Design and construction

The need for a large number of cruisers to execute a global naval war called for immediate production of existing designs. The design genesis of the Cleveland class was simply taking the *Helena* and replacing one triple 6-inch turret with two 5-inch/38 mounts placed on the centerline. There were concerns about using the *Helena* design which was top heavy, so the new class had its beam increased by 2 feet and the new design was 230 tons lighter than *Helena*. With time being the prime factor, the new design was quickly completed and approved in October 1939. The first two ships were ordered in March 1940. A total of 39 ships were planned, but of these only 26 were completed as light cruisers which still made this the largest class of light cruisers ever by a wide margin. Additionally, another was completed in 1958 as a guided-missile cruiser, nine were completed as light carriers of the highly successful Independence class, and three others were canceled. A further thirteen ships were ordered to an improved design using the benefit of war experience. These improved ships were given a new class name after the lead ship *Fargo*, but only two were commissioned.

This bow view from January 1943 of *Denver* gives a good impression of the rounded bridge which was a recognition feature of the early ships in the class. The centerline placement of the forward 5-inch/38 twin mount is also evident.



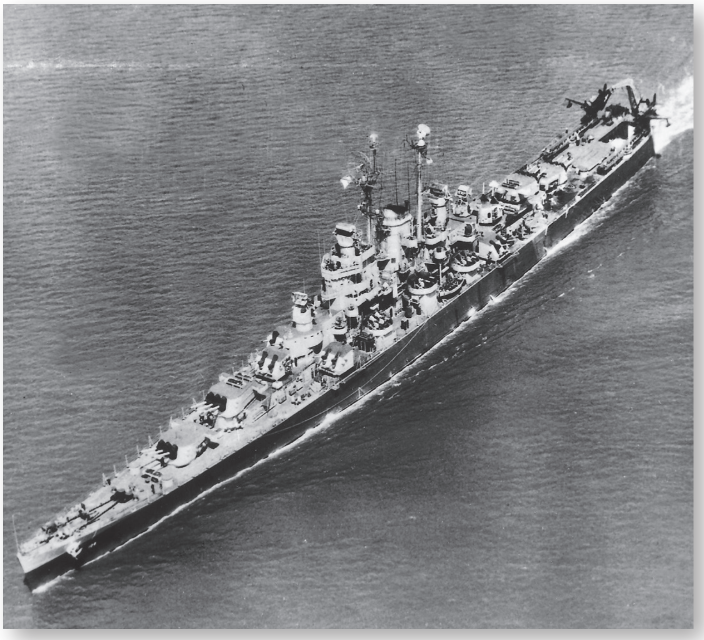
The design was adopted with little margin in stability to add anything. However, the requirement to add 40mm and 20mm guns for air defense, while not reducing the 12-gun 5-inch/38 battery, was paramount. Stability was maintained by adding ballast and using a hull redesign which moved the belt from sloping inward to sloping outward, giving the hull a slight tumblehome appearance. These ships faced critical stability issues throughout their lives which were continually worsened with the addition of more antiaircraft guns and electronics.

Protection was similar to that of the Brooklyn class with a main belt with a maximum of 5 inches of armor; horizontal protection was provided by a 2-inch armored deck. The turret barbettes received 6 inches; the four 6-inch turrets had 6.5-inches of face armor and 3 inches on the tops and sides. The conning tower was protected by 5 inches. The total weight of armor was 1,468 tons.

The same engineering plant as used on the Atlanta class was adopted. High-pressure boilers were retained which were more efficient and weighed less, and the unit principle was again employed which separated the boiler and engineering spaces.

Cleveland-Class Construction

Ship	Built at	Laid down	Launched	Commissioned	Fate
Cleveland (CL55)	New York Shipbuilding	Jun. 1, 1940	Nov. 1, 1941	Jun. 15, 1942	Scrapped, 1960
Columbia (CL56)	New York Shipbuilding	Aug. 19, 1940	Dec. 17, 1941	Jul. 29, 1942	Scrapped, 1959
Montpelier (CL57)	New York Shipbuilding	Dec. 2, 1940	Feb. 12, 1942	Sep. 9, 1942	Scrapped, 1960
Denver (CL58)	New York Shipbuilding	Dec. 26, 1940	Apr. 4, 1942	Oct. 15, 1942	Scrapped, 1960
Amsterdam (CL59)	New York Shipbuilding	May 1, 1941	–	–	Completed as light carrier *Independence*
Santa Fe (CL60)	New York Shipbuilding	Jun. 7, 1941	Jun. 10, 1942	Nov. 24, 1942	Scrapped, 1960
Tallahassee (CL61)	New York Shipbuilding	Jun. 2, 1941	–	–	Completed as light carrier *Princeton*
Birmingham (CL62)	Newport News	Feb. 17, 1941	Mar. 20, 1942	Jan. 29, 1943	Scrapped, 1959
Mobile (CL63)	Newport News	Apr. 14, 1941	May 15, 1942	Mar. 24, 1943	Scrapped, 1960
Vincennes (CL64)	Bethlehem, Quincy, Massachusetts	Mar. 7, 1942	Jul. 17, 1943	Jan. 21, 1944	Sunk as a target, 1969
Pasadena (CL65)	Bethlehem, Quincy	Feb. 6, 1943	Dec. 28, 1943	Jun. 8, 1944	Scrapped, 1972
Springfield (CL66)	Bethlehem, Quincy	Feb. 13, 1943	Mar. 9, 1944	Sep. 9, 1944	Converted into guided-missile cruiser in 1960; scrapped, 1980
Topeka (CL67)	Bethlehem, Quincy	Apr. 21, 1943	Aug. 19, 1944	Dec. 23, 1944	Converted into guided-missile cruiser in 1960; scrapped, 1975
New Haven (CL76)	New York Shipbuilding	Aug. 11, 1941	–	–	Completed as light carrier *Belleau Wood*
Huntington (CL77)	New York Shipbuilding	Nov. 17, 1941	–	–	Completed as light carrier *Cowpens*
Dayton (CL78)	New York Shipbuilding	Dec. 29, 1941	–	–	Completed as light carrier *Monterey*
Wilmington (CL79)	New York Shipbuilding	Mar. 16, 1942	–	–	Completed as light carrier *Cabot*
Biloxi (CL80)	Newport News	Jul. 9, 1941	Feb. 23, 1943	Aug. 31, 1943	Scrapped, 1962
Houston (CL81)	Newport News	Aug. 4, 1941	Jun. 19, 1943	Dec. 20, 1943	Scrapped, 1960
Providence (CL82)	Bethlehem, Quincy	Jul. 27, 1943	Dec. 28, 1944	May. 15, 1945	Converted into guided-missile cruiser in 1959; scrapped 1980
Manchester (CL83)	Bethlehem, Quincy	Sep. 25, 1944	Mar. 5, 1946	Oct. 29, 1946	Scrapped, 1961
Buffalo (CL84)	Federal, Kearny	Never	–	–	Canceled, December 1940
Fargo (CL85)	New York Shipbuilding	Apr. 11, 1942	–	–	Completed as light carrier *Langley*
Vicksburg (CL86)	Newport News	Oct. 26, 1942	Dec. 14, 1943	Jun. 12, 1944	Scrapped, 1964
Duluth (CL87)	Newport News	Nov. 9, 1942	Jan. 13, 1944	Sep. 18, 1944	Scrapped, 1960
Unnamed (CL88)	Federal, Kearny	Never	–	–	Canceled, December 1940
Miami (CL89)	Cramp, Philadelphia	Aug. 2, 1941	Dec. 8, 1942	Dec. 28, 1943	Scrapped, 1962
Astoria (CL90)	Cramp, Philadelphia	Sep. 6, 1941	Mar. 6, 1943	May 17, 1944	Scrapped, 1971
Oklahoma City (CL91)	Cramp, Philadelphia	Dec. 8, 1942	Feb. 20, 1944	Dec. 22, 1944	Converted into guided-missile cruiser in 1960; sunk as target, 1999
Little Rock (CL92)	Cramp, Philadelphia	Mar. 6, 1943	Aug. 27, 1944	Jun. 17, 1945	Converted into guided-missile cruiser in 1960; preserved as a museum ship in Buffalo, NY
Galveston (CL93)	Cramp, Philadelphia	Feb. 20, 1944	Apr. 22, 1945	May 28, 1958	Converted into guided-missile cruiser in 1958; scrapped, 1975
Youngstown (CL94)	Cramp, Philadelphia	Sep. 4, 1944	Never	–	Canceled, August 1945
Buffalo (CL99)	New York Shipbuilding	Aug. 31, 1942	–	–	Completed as light carrier *Bataan*
Newark (CL100)	New York Shipbuilding	Oct. 26, 1942	–	–	Completed as light carrier *St. Jacinto*
Amsterdam (CL101)	Newport News	Mar. 3, 1943	Apr. 25, 1944	Jan. 8, 1945	Scrapped, 1971
Portsmouth (CL102)	Newport News	Jun. 28, 1943	Sep. 20, 1944	Jun. 25, 1945	Scrapped, 1971
Wilkes-Barre (CL103)	New York Shipbuilding	Dec. 14, 1942	Dec. 24, 1943	Jun. 1, 1944	Sunk off Florida, 1972
Atlanta (CL104)	New York Shipbuilding	Jan. 25, 1943	Feb. 6, 1944	Dec. 3, 1944	Scuttled, 1970
Dayton (CL105)	New York Shipbuilding	Mar. 8, 1943	Mar. 19, 1944	Jan. 7, 1945	Scrapped, 1962



Fargo was the lead ship of what was envisioned as a follow-on to the Cleveland class, but the approaching end of the war meant only two ships were completed. This view of *Fargo* in April 1946 highlights the major differences of the two classes. The two stacks were truncated into one thick stack and the superstructure compressed to give the antiaircraft guns better arcs of fire. The 5-inch/38 battery still included six twin mounts, but these are placed lower to increase stability.

The propulsion system generated 100,000shp which was sufficient to drive the ship at its design speed of 32.5 knots, though in service 30 knots was more common.

The ship's aviation facilities were retained aft. Two catapults were fitted, supported by a crane on the fantail. Four aircraft could be carried.

The Fargo class was a modified Cleveland class design which incorporated lessons learned from war experience. Since the biggest problem with the Clevelands was instability, most external changes were driven by reducing top weight. This meant lowering the armament and simplifying the superstructure. Internally, compartmentation was increased and the boiler rooms arranged so that only a single stack was required. This was the only major difference apparent, with all other major characteristics being unchanged. The construction scheme for the Fargo class demonstrates the extravagance of the USN's wartime cruiser program. As many as 16 ships were planned for 1943 and another seven for 1944. All were canceled in 1944 and 1945 except for two that were completed to this design, three as regular Clevelands and four re-ordered as Worcester-class ships.

Fargo-Class Construction

Ship	Built at	Laid down	Launched	Commissioned	Fate
Fargo (CL106)	New York Shipbuilding	Aug. 23, 1943	Feb. 25, 1945	Dec. 9, 1945	Scrapped, 1970
Huntington (CL107)	New York Shipbuilding	Oct. 4, 1943	Apr. 8, 1945	Feb. 23, 1946	Scrapped, 1962

Armament

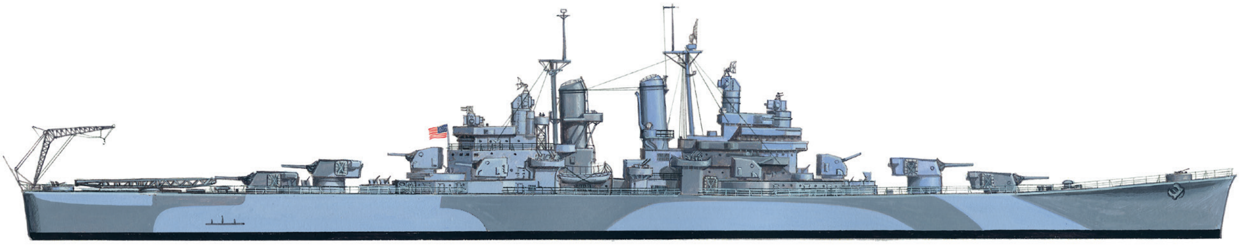
The 6-inch/47 Mk 16 had proved very successful in service and was retained as the main battery for the Cleveland class. Twelve guns were carried in four triple turrets with fire control provided by two Mk 34 directors. The antiaircraft battery included 12 5-inch/38 guns fitted in six twin mounts. Two of these were

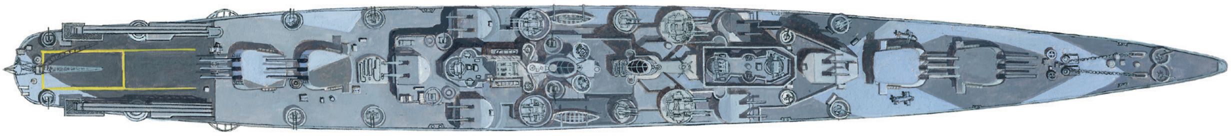
F

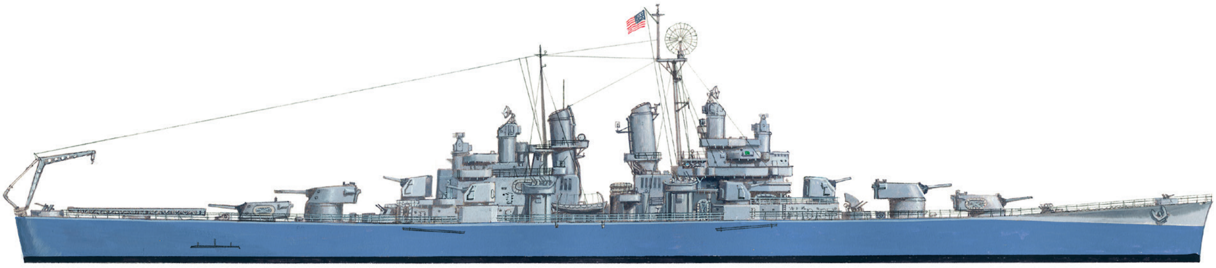
THE CLEVELAND CLASS

The top and middle profiles show *Houston* in a mid-war configuration. The electronics fit includes an SK radar on the foremast and SGs on both masts; the Mk 34 and 37 directors are also both radar-equipped. The antiaircraft fit has not reached its final limit, but already four quad and two twin 40mm mounts are evident. In addition, 20 single 20mm guns are aboard. The ship is in an Ms 32/1d dazzle scheme. These were designed as an antisubmarine scheme intended to delay recognition and cause confusion as to the ship's course and speed.

The bottom profile shows *Vincennes* in late-war configuration. An SK-2 radar has been placed on the platform on the foremast. The antiaircraft battery has reached its final configuration with four quad and six twin 40mm mounts. The 20mm fit has been reduced to ten single mounts.







CLEVELAND-CLASS WARTIME SERVICE

The lead ship of the class, *Cleveland*, joined the fleet in time to participate in the North African landings. Following North Africa, she transferred to the Pacific and took part in the last phases of the Guadalcanal campaign. *Cleveland* participated in the successful March 6, 1943 encounter against an IJN destroyer force, then supported the landings on New Georgia in June, and then fought at the battle of Empress Augusta Bay on November 1–2. In 1944, she took part in the battle of the Philippine Sea, and then in several landings in the Philippines into 1945 before joining the prolonged Okinawa campaign. She was decommissioned in 1947, and scrapped in 1960.

Columbia was also active in the final stages of the Guadalcanal campaign before joining the advance up the Solomons fighting at New Georgia and Empress Augusta Bay. Following a refit and the landings on the Palau Islands, she took part in the invasion of Leyte and fought at the battle of Surigao Strait. While supporting the landings on Luzon, she was hit in the Lingayen Gulf by kamikazes on January 6 and 9, 1945. This forced her back to the United States for repairs, but the cruiser returned in time for the landings at Balikpapan on Borneo and the final stages of the Okinawa campaign. She was decommissioned in 1946.

Montpelier arrived in the South Pacific in time for the final stages of the Guadalcanal campaign, and then advanced through the Solomons, fighting at Empress Augusta Bay. She was active in the invasion of the Marianas and the battle of the Philippine Sea. In late 1944 and into 1945, she supported multiple landings in the Philippines before participating in the Balikpapan landings in June. She was decommissioned in 1947.

Denver also took part in the March 6 sinking of two Japanese destroyers off Kolombangara, supported the landings on New Georgia, and then routed an IJN task force at Empress Augusta Bay. Only days later, on November 13, the cruiser was hit by an air-launched torpedo in her aft engine room which caused severe flooding and forced her back to the United States for repairs. After returning to service, she took part in the Palau landings, and then supported the Leyte invasion, including defeating an IJN task force in the Surigao Strait. She remained in the Philippines until May 1945, before supporting the Balikpapan landings. After participating in the Okinawa campaign, she was decommissioned in 1947.

Santa Fe began her combat career in the North Pacific in April 1943 before assuming carrier escort duties during the Gilberts and Marshalls operations. She remained with the fast carriers for the remainder of the war, participating in the raid on Truk in February 1944, the Hollandia operation in April, the battle of the Philippine Sea, the invasions of Leyte and Luzon, and the first massive carrier raids on Japan in February 1945. *Santa Fe* was decommissioned in 1946.

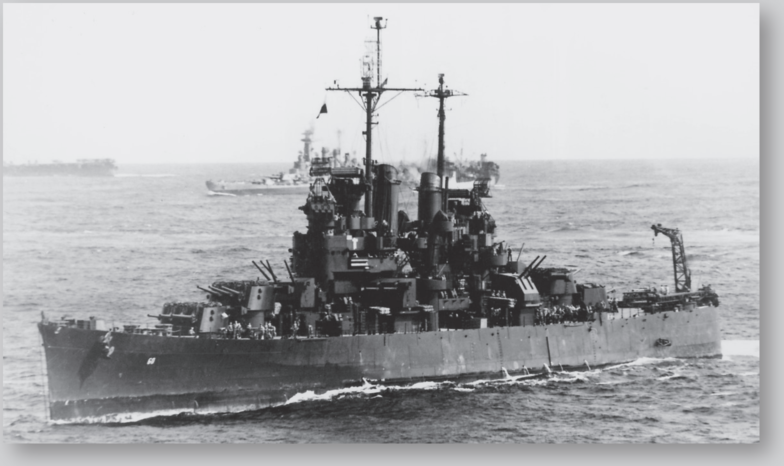
Birmingham was the only other cruiser of her class besides *Cleveland* to see combat duty outside the Pacific when she supported the landings on Sicily. After transferring to the Pacific, she supported the landings on Bougainville in the northern Solomons and on November 8 was struck by an aircraft-launched torpedo on her port bow and two bombs. Damage was moderate as the cruiser remained in formation before leaving the combat area for repairs. Following repairs, she joined the Fast Carrier Force and fought at Philippine Sea. At Leyte Gulf on October 24 she was rendering aid alongside the damaged light carrier *Princeton* when a large explosion occurred on the carrier, causing extensive topside damage on *Birmingham* and heavy casualties. After again returning to service, she participated in the Iwo Jima landing and the Okinawa campaign where she was damaged by a kamikaze on May 4, 1945. The cruiser returned in time for the last weeks of the war before being decommissioned in early 1947.

Mobile began her wartime service on carrier escort duties in August 1943. She was active in the northern Solomons in November, and then supported the Gilberts and Marshalls operations. Again with the fast carriers, she was present during the raid on Truk, the Hollandia operation, and Philippine Sea. At the battle of Leyte Gulf, she joined with *Santa Fe* and other warships to sink the disabled IJN carrier *Chiyoda*. After seeing service off Okinawa, she was decommissioned in 1947.

Vincennes was named after a heavy cruiser sunk at Savo Island in August 1942. She did not arrive in the Pacific until May 1944 and was assigned to the Fast Carrier Force. She remained with the carriers until June 1945 taking part in Philippine Sea, Leyte Gulf, the Philippines campaign, Okinawa, and the carrier raids on Japan. She was decommissioned in 1946 and expended as a target in 1969.

Pasadena did not enter the war until September 1944, and served on carrier escort duty through the end of the war seeing action in the Philippines, Okinawa, and during the carrier raids on Japan. After the war she remained active until early 1950 when she was decommissioned.

Springfield was one of six Cleveland-class cruisers to have a second life as a guided-missile cruiser. She had a brief Pacific War career beginning in March 1945, seeing action off Okinawa and during the carrier raids on Japan. She remained active until 1950, underwent conversion into a guided-missile cruiser, and was active in this role from 1960 to 1974.



This January 1944 view shows *Santa Fe* in an Ms 21 scheme. She was completed with only two twin 40mm mounts on each beam and a large number of single 20mm guns. The radar fit includes an SK on the foremast and two SGs on the pole masts. *Cleveland*, *Montpelier*, and *Santa Fe* all had 13 Battle Stars, the most of any ships in the class.

Topeka had a brief wartime career from May 1945 and remained active until 1949. She also was converted into a missile cruiser and saw service as such from 1960 to 1969 before being scrapped in 1975.

Biloxi arrived in the Pacific early enough to take part in the invasion of Kwajalein in January 1944, followed by duty with the Fast Carrier Force at Truk, Hollandia, Philippine Sea, Letye Gulf, raids on Japan, and Iwo Jima. At Okinawa, she was damaged by a kamikaze on March 27. She was decommissioned in 1946.

Houston, named after a heavy cruiser sunk early in the war, had the dubious distinction of being the most heavily damaged Cleveland-class cruiser of the war. After supporting the invasion of the Marianas, she was operating off Formosa when she was torpedoed by a Japanese aircraft on October 14. The torpedo hit flooded all four engineering spaces which caused a loss of power. While being towed out of the battle area, the cruiser was struck again by an aircraft torpedo on October 16. Despite the resulting fire and more flooding, the crew managed to bring its ship to safety. Repairs took until after the war, and the cruiser was decommissioned in 1947.

Providence entered service in 1945 too late to see action during the Pacific War and was decommissioned in 1949. She was brought back into service as a guided-missile cruiser and served in this capacity from 1959 to 1973 and was scrapped in 1980.

Manchester was not commissioned until 1946 and was the last all-gun Cleveland-class cruiser in service when she was decommissioned in 1956. She saw combat during the Korean War.

Vicksburg did not reach the Pacific until January 1945. Her first combat operation was supporting the landing on Iwo Jima in February after which she was assigned to the Fast Carrier Force and took part in the raids on Japan followed by the invasion of Okinawa. She was decommissioned in 1947.

Duluth entered the Pacific War in April 1945 and was assigned to the Fast Carrier Force. After suffering typhoon damage in June, she returned to take part in the final carrier raids on Japan. She remained active until 1949.

Miami arrived in the Pacific in May 1944 and was assigned to escort the fast carriers. She was present at the invasion of the Marianas, the Palaus, and then the Philippines. She remained with the carriers for the first raids on Japan, and the first stages of the Okinawa campaign. In April, she underwent refit which took her out of the remainder of the war. In 1947, *Miami* was decommissioned and she was scrapped in 1962.

Astoria was named after another heavy cruiser lost at Savo Island. She entered the war in December 1944 and served in the Fast Carrier Force until the end of the conflict. She participated in the last phases of the Philippines campaign, the first carrier raids on Japan, Iwo Jima, Okinawa, and the final raids on Japan in July and August. She remained in service until 1949.

Oklahoma City began her combat career in May 1945 and participated in the Okinawa campaign and the final carrier raids on Japan in July and August. She was decommissioned in 1947, but converted into a guided-missile cruiser and re-entered service in 1960. She was decommissioned for the last time in 1979 and subsequently used as a target ship.

Little Rock did not commission in time to see service in the Pacific War. She remained active until 1949, was decommissioned, and then converted into a guided-missile cruiser in 1960. She remained active in this role until 1976 but avoided the scrappers when she was moved to Buffalo, New York in 1977 as a museum ship. She is the only USN light cruiser still in existence.

Galveston was never completed, but placed directly in reserve in 1946 after work was suspended. This accounts for the disparity in most accounts which state there were 27 Cleveland-class ships; since *Galveston* never completed as a light cruiser, this leaves only 26 ships in the class. She underwent conversion into a guided-missile cruiser and finally entered service in 1958. She was decommissioned in 1970.

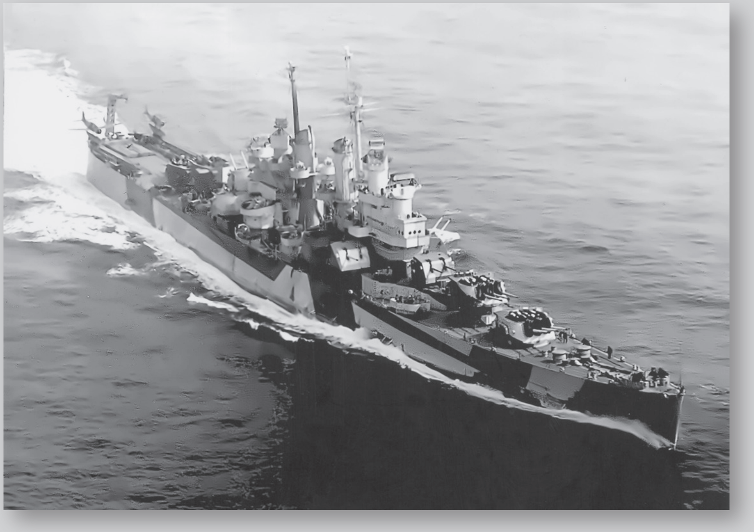
Amsterdam reached the Pacific to see brief service with the Fast Carrier Force before the end of the war. She was decommissioned in 1947.

Portsmouth did not see service in the Pacific War and was decommissioned in 1949.

Wilkes-Barre began her combat career in December 1944 with the Fast Carrier Force. She covered the landings on Luzon in January 1945, and then remained with the carriers as they raided Japan in February and March, supported the Okinawa invasion from April to July, and then took part in the final raids on Japan until the end of the war. She was decommissioned in 1947 and was sunk off the Florida Keys as an artificial reef in 1972.

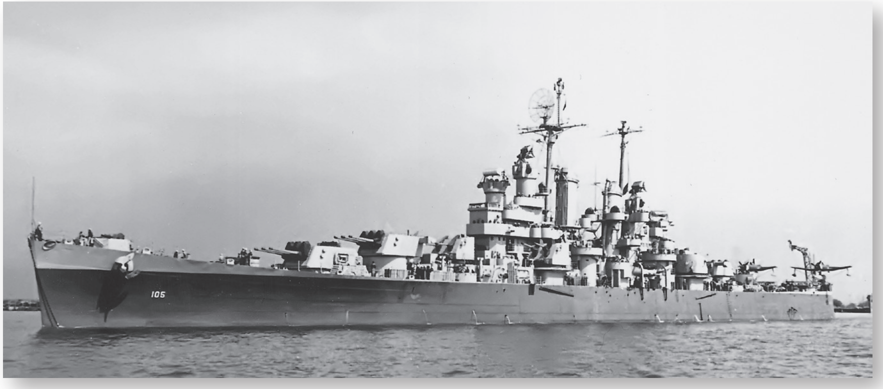
Atlanta was named after the light cruiser sunk off Guadalcanal in 1942. She entered service in 1945 and participated in the final stages of the Okinawa campaign followed by the carrier raids on Japan. She was decommissioned in 1949, but was used in shock testing from 1964 to 1970 until being scuttled.

Dayton was active with the Fast Carrier Force from July 1945 until the end of the war. She was decommissioned in 1949.



Vincennes in 1944 wearing an Ms 33/3d dazzle scheme. *Vincennes* was the first ship to be built with a square bridge which is evident in this view. The ship carries two quad and one twin 40mm mounts on each beam and a large number (approximately 20) of single 20mm guns.

Among the last Cleveland-class cruisers commissioned was *Dayton*, shown here in April 1945. Her short wartime career included screening the Third Fleet's carriers in July and August during the final carrier raids on Japan. The ship was completed with all late-war modifications including an SK-2 radar on the foremast, Mk 13 radars on the Mk 34 directors, Mk 12/22 radars on the Mk 37 directors, and a full battery of 40mm guns. The ship is in an Ms 22 scheme.



fitted on the centerline for the first time on a USN light cruiser. Two Mk 37 directors were fitted to provide fire control. The original light antiaircraft suite was limited to machine guns which was clearly inadequate. The stability issue presented a persistent problem to upgrading the antiaircraft suite throughout the war. *Cleveland* was completed with four twin 40mm mounts and 15 20mm singles. The second ship, *Columbia*, was completed with two quad and two twin 40mm mounts and a similar number of single 20mm guns.

Service Modifications

The first seven ships were completed with round bridges. Starting with *Vincennes*, all units received a square open bridge. *Vincennes* was also the first ship with a full CIC upon completion. Major modifications were limited by the need to produce ships quickly and by the stability problem. Despite best efforts to limit the weight growth, *Cleveland* showed an increase in 480 tons which was mainly top weight and only made the stability issues worse.

In spite of this, the antiaircraft battery grew throughout the war. Four more positions for 40mm guns were found on the main deck between the centerline 5-inch/38 mounts and the super-firing 6-inch turrets. By May 1944, the uniform 40mm battery was set at four quad and six twin mounts for all ships. The 20mm suite varied during the war rising to as many as 21 on some ships without the full 40mm fit, but was reduced to ten by late war. To compensate, in 1945, one of the catapults was eliminated. Turret rangefinders were removed from turrets 1 and 4. Later units were also completed with no conning tower.

The electronics suite was continually updated throughout the war. The Mk 34 director received the Mk 3 radar but by war's end most ships had received the Mk 8 or 13 radars. Likewise, the Mk 37 director was fitted with the Mk 4 mid war, and then later with the Mk 12/22. Early ships received the SC for surface search, but by late war, all were fitted with the SK and some received the SP on their mainmast. One or two SGs were also fitted, depending on whether the SP was present.

Cleveland-Class Specifications	
Displacement	11,744 tons standard; 14,131 tons full load
Dimensions	Length 610ft, 1in overall; Beam 66ft 4in; Draft 24ft 6in
Speed	32.5kts
Range	11,000nm at 15kts
Crew	1,285

Worcester Class

Design and construction

The last class of USN light cruisers was built around the twin dual-purpose 6-inch/47 mounts which had been in development since before the war. By the time these ships were laid down in 1945, the tactical requirement for a large light cruiser with a battery capable of engaging high-altitude bombers at extended ranges seemed dubious, and in fact, very much out of date.

Design work on what was the USN's first all-new light cruiser since the Brooklyn class began in May 1941. The original requirement was for a ship equipped with 12 of the new dual-purpose 6-inch guns in six twin turrets and heavy deck armor in order to survive high-altitude bombing. Early designs proved it was difficult to create a balanced ship on less than a standard displacement of some 14,000 tons. This made it the largest USN light cruiser ever, and placed it in direct competition with the USN's postwar heavy cruiser designs which were only slightly larger. In fact, it was recommended in 1944 that the light cruisers be abandoned and heavy cruisers with their automatic 8-inch guns be built instead. However, the large light cruisers were saved by the shortage of the new 8-inch guns, so it was agreed to build four of the Worcester-class light cruisers. In the end, only two were completed with the other two being canceled in August 1945.

Worcester-Class Construction

Ship	Built at	Laid down	Launched	Commissioned	Fate
Worcester (CL144)	New York Shipbuilding	Jan. 29, 1945	Feb. 4, 1947	Jun. 26, 1948	Scrapped, 1972
Roanoke (CL145)	New York Shipbuilding	May 15, 1945	Jun. 16, 1947	Apr. 4, 1949	Scrapped, 1973

As might be expected of a ship this size, protection was extensive with armor totaling 2,119 tons. The 370-foot long main belt was a maximum of 5 inches thick, and horizontal protection on the upper and main armored decks totaled 4.5 inches. Internal compartmentation was extensive with each of the four boilers in its own space.

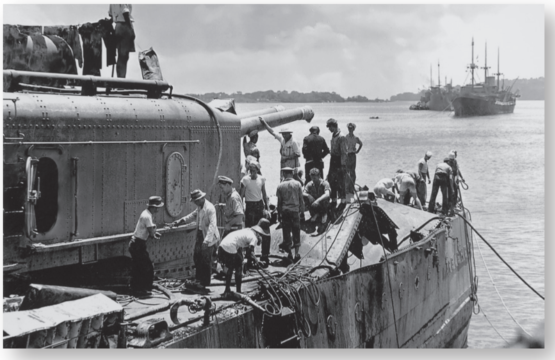
The class was not considered to be a successful design. The ships were wet, but the biggest problem was the unreliability of the new automatic 6-inch turrets.

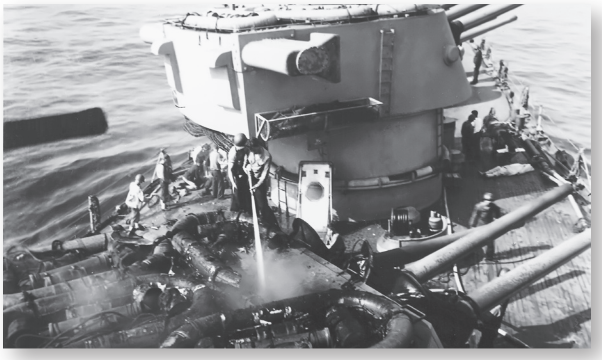
Armament

These cruisers were built without a mixed main and antiaircraft battery. The main battery comprised six twin 6-inch/47 turrets able to engage air and surface targets. The ships were also commissioned with a strong antiaircraft suite of 11 quad and two twin 40mm mounts. Twelve twin 20mm mounts were planned, but *Worcester* was completed with six and *Roanoke* eight. The 40mm mounts were replaced postwar with a total of 24 twin and single 3-inch/50 guns. Fire control was of a new standard for a light cruiser with four Mk 37 directors. There was no dedicated director for surface fire, but two Mk 13 radars were placed on the centerline and each turret had a radar rangefinder.

Service History

Both ships entered service well after the Pacific War. *Worcester* was completed in 1948, but only served for a decade before being decommissioned in November 1958. The highlight of her wartime career was participating in the landings at Inchon, Korea in 1950. She was the last all-gun light cruiser in USN service. *Roanoke* entered service in 1949 and was retired in October 1958.





LEFT
Marblehead barely survived being bombed in February 1942. This shows the effect of two 220-pound bomb hits on the stern. The ship returned to the United States after an epic voyage without a functional rudder.

RIGHT
On September 11, 1943 while supporting the Allied invasion of Salerno, *Savannah* was struck by a German radio-guided bomb. The bomb struck the top of Turret 3 and penetrated all the way to the magazine. This photograph shows crewmen pouring water down the hole made by the bomb.

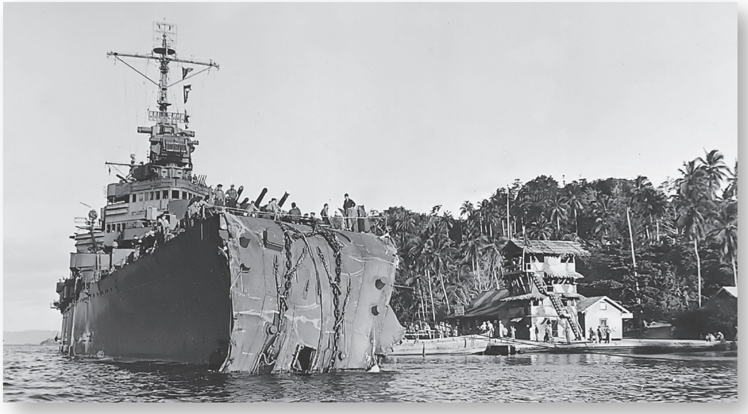
Worcester-Class Specifications	
Displacement	14,700 tons standard; 17,997 tons full load
Dimensions	Length 679ft, 6in overall; Beam 70ft 8in; Draft 24ft 9in
Speed	33kts
Range	8,000nm at 15kts
Crew	1,401

ANALYSIS AND CONCLUSION

The Omahas were not a successful design. As has been mentioned, they were not committed to high-threat areas during the war. When exposed to damage they fared poorly. *Raleigh* was torpedoed and hit by an aircraft bomb at Pearl Harbor, and clearly would have sunk had she not been moored in harbor where aggressive damage-control measures could be employed. In the NEI, *Marblehead* was hit by two 220-pound aircraft bombs and another near-miss. Her ineffective antiaircraft battery was unable to protect her from attack and, when struck by bombs, she nearly succumbed to flooding and fires.

The Brooklyn class had a much better war record. The five ships which started the war in the Pacific proved to be powerful warships. *Boise* seemed destined for an early end since she was assigned to the Asiatic Fleet with its hopeless mission of defending the NEI, but ran aground and was sent home for repairs. *Helena* was damaged at Pearl Harbor. That left three Brooklyns in the early-war period soon to be joined by *Nashville*. The ships performed well in the fierce night battles in the Solomons and, although handicapped by USN night-fighting doctrine and the limitations of early radar, were clearly superior to IJN light cruisers.

The four ships which spent their careers in the Atlantic were used almost exclusively in a shore bombardment role. In this capacity, they were very successful since their rapid-fire 6-inch shells could flood a troop concentration with high explosives. At the landings at Gela, Sicily on July 10 and 11, 1943, *Boise* and *Savannah*'s fires were instrumental in repelling



Italian and German armored attacks. USN gunfire support, principally from the cruisers, played an instrumental role in defeating the German attack on July 11. At Salerno in southern Italy, the story was repeated from September 9 to 17 as American troops battled to establish a beachhead, defeat German counterattacks, and then breakout. On D-Day alone, *Savannah* fired 605 rounds of 6-inch shells and *Philadelphia* another 305. At Anzio during January 1944, *Brooklyn* provided sustained fire support, and *Philadelphia* supported the breakout from the beachhead in May.

Several Brooklyns were damaged, proving they could take a beating. *Savannah* and *Philadelphia* were the targets of German guided-bomb attacks and *Savannah* was nearly sunk when a bomb penetrated the ship's armor to hit a magazine. This was the largest bomb to hit a USN ship during the entire war, but *Savannah* survived, though she was under repairs for most of the remainder of the war. In the Pacific, the main threat was torpedoes, and these ships proved able to survive a single hit, especially in a non-critical area. *Helena* was the only ship of her class lost, but no light cruiser could be expected to deal with the damage wrought by three torpedoes.

Ship	Agent of Damage	Date	Fate
Omaha Class			
Raleigh	1 torpedo, 1 550-lb bomb	Dec. 7, 1941	Almost sank
Marblehead	2 220-lb bombs	Feb. 4, 1942	Almost sank
Brooklyn Class			
Savannah	1 PC 1400FX bomb	Sep. 11, 1943	Heavy damage
Nashville	1 kamikaze	Dec. 13, 1944	Moderate damage
Boise	3 8-inch shells	Oct. 11–12, 1942	Heavy damage
Honolulu	1 torpedo	Jul. 12–13, 1943	Moderate damage
Honolulu	1 torpedo	Oct. 20, 1944	Moderate damage
St. Louis	1 torpedo	Jul. 12–13, 1943	Moderate damage
St. Louis	1 aircraft bomb	Feb. 14, 1944	Light damage
St. Louis	2 kamikazes	Nov. 27, 1944	Light damage
Helena	1 torpedo	Dec. 7, 1941	Moderate damage
Helena	3 torpedoes	Jul. 5–6, 1943	Sunk
Atlanta Class			
Atlanta	At least 32 shells, 1 torpedo	Nov. 12–13, 1942	Scuttled
Juneau	2 torpedoes	Nov. 12–13, 1942	Sunk
Reno	1 torpedo	Nov. 4, 1944	Heavy damage
Cleveland Class			
Columbia	2 kamikazes	Jan. 6 and 9, 1945	Moderate damage
Denver	1 torpedo	Nov. 13, 1943	Moderate damage
Birmingham	1 torpedo, 2 bombs	Nov. 8–9, 1943	Moderate damage
Birmingham	Explosion	Oct. 24, 1944	Moderate damage
Birmingham	1 kamikaze	May 4, 1945	Moderate damage
Biloxi	1 kamikaze	Mar. 27, 1945	Light damage
Houston	2 torpedoes	Oct. 14–16, 1944	Almost sank

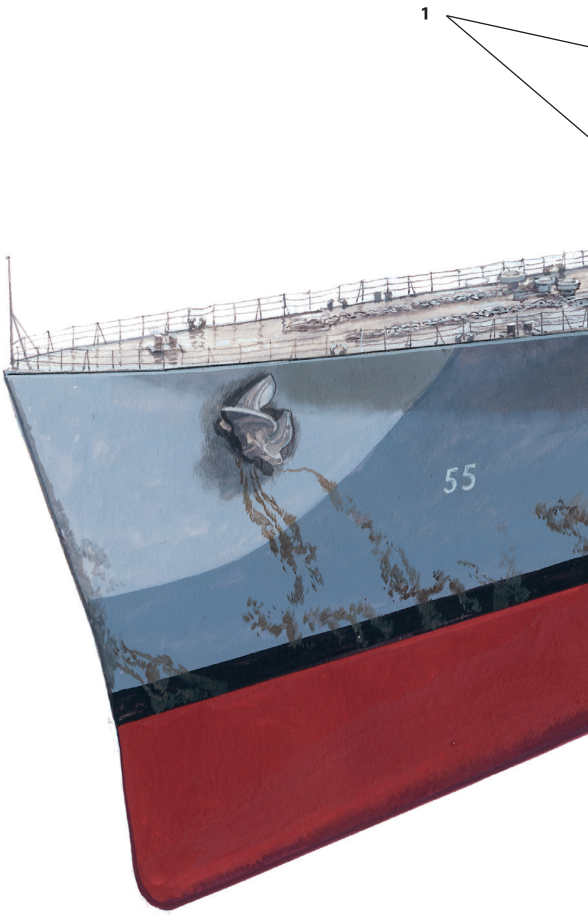
The Atlantas were graceful ships, probably the best-looking USN light cruiser. However, they were very cramped which grew worse as the numbers of antiaircraft guns increased and the electronics fit became more complex. Atlanta-class units were used in carrier-screening duty and were often used

The other USN cruiser damaged at Kolombangara was *Honolulu*, shown here with her bow collapsed after it was hit by a torpedo. Remarkably, there were no casualties, but the cruiser was out of action for four months. Another torpedo hit the ship in the stern, but failed to explode.

G

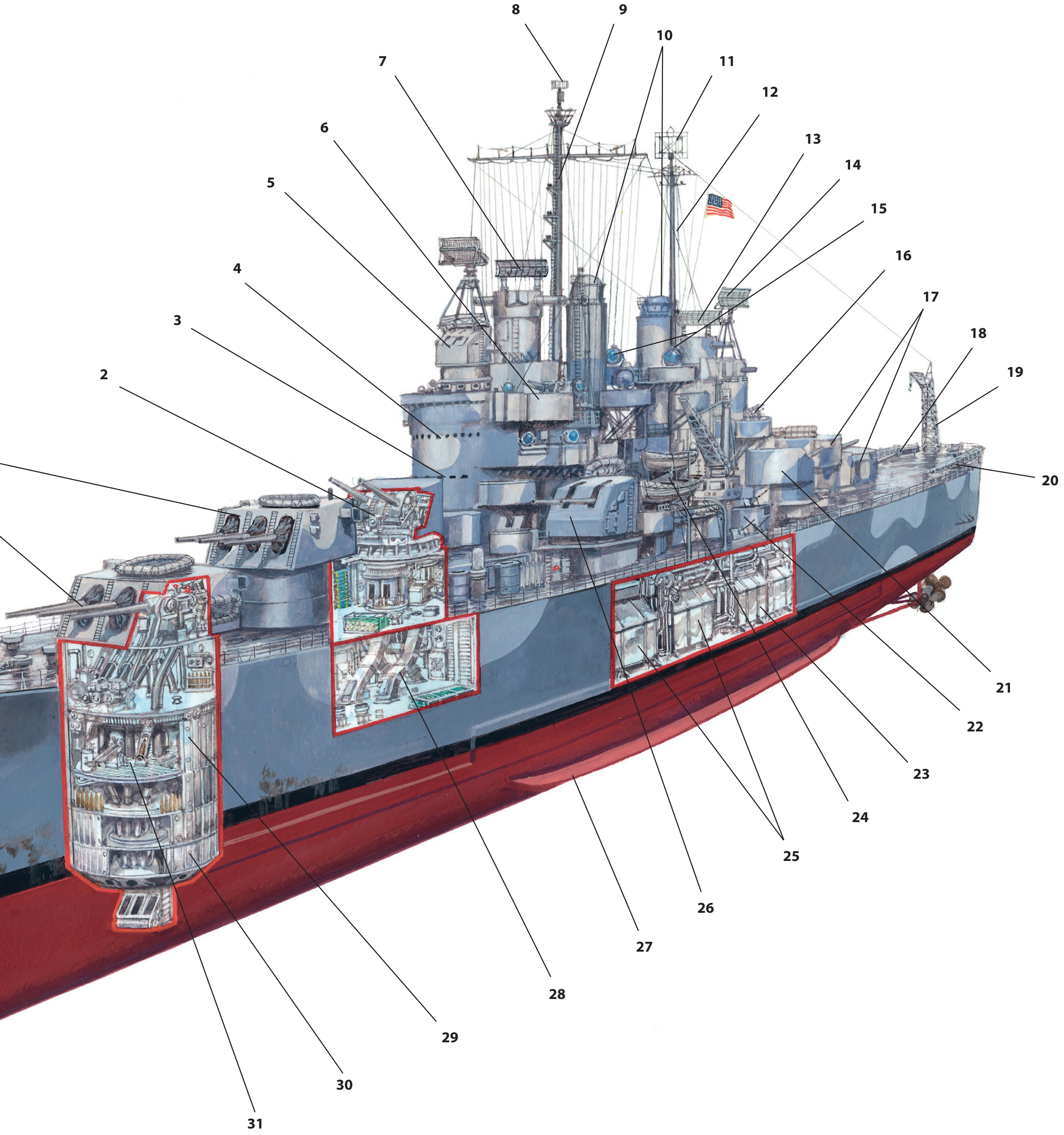
CLEVELAND

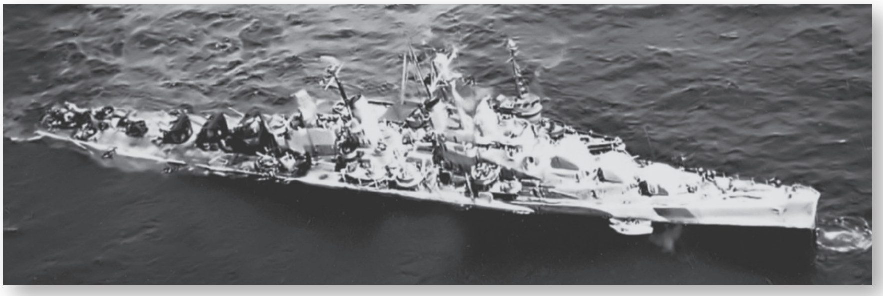
This view is of cruiser *Cleveland* as she appeared in June 1942 at the time of her completion. The cruiser was the lead ship of the largest class of light cruisers ever built. Despite a perpetual problem with instability, these ships were the most heavily armed light cruisers of the war and posted fine war records with none being lost to enemy action.



KEY

1. 6-inch/47 triple turret (4)
2. 5-inch/38 twin turret (6)
3. Conning tower
4. Pilot house
5. Mark 37 Director with Mark 4 radar
6. 40mm twin mounts (4)
7. Mark 34 Director with Mark 3 radar
8. SG Radar
9. Foremast
10. Stacks (2)
11. SC radar
12. Mainmast
13. Mark 34 Director with Mark 3 radar
14. Mark 37 Director with Mark 4 radar
15. Searchlights (4)
16. 40mm twin mounts (4)
17. 6-inch/47 triple turret (4)
18. Aircraft catapults
19. Crane
20. Aircraft catapults
21. 5-inch/38 twin turret (6)
22. 20mm single mounts (15)
23. Engine room
24. Ship's boats
25. Boiler rooms
26. 5-inch/38 twin turret (6)
27. Main armor belt
28. Shell handling room
29. Turret barbette
30. Magazine
31. Shell handling room


8
9
10
11
7
12
6
13
14
5
15
16
4
17
3
18
2
19
20
21
22
23
24
25
26
27
28
29
30
31

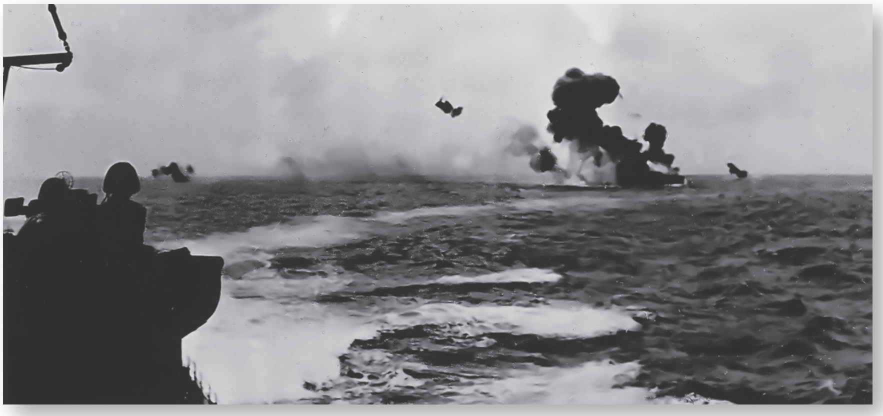


Reno's brief but active wartime career came to an end when she was torpedoed off San Bernardino Strait on November 3 by a Japanese submarine. Only two men were killed and four wounded, but repairs took the rest of the war. This photograph shows the cruiser two days later with her stern awash and a tug alongside. *Reno* was the most heavily damaged Atlanta-class cruiser to survive the war.

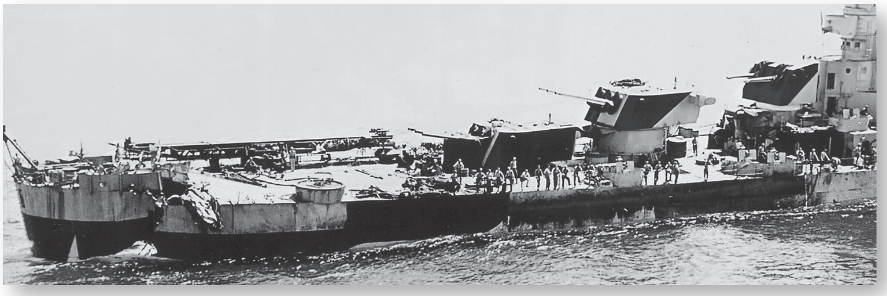
to screen flagships. According to their design purpose, they were used to lead destroyers in the fierce night battle off Guadalcanal in November 1942. The lightly protected cruisers fared poorly in this role and the Americans did not repeat this mistake again. They performed well as carrier-screening units. In actuality, they were more super-destroyers than true cruisers with their 5-inch main battery, antisubmarine equipment, and lack of aviation facilities.

The Clevelands were a hurried design which did not take into account war experience from Europe. Since the USN had calculated that a single torpedo hit could sink these cruisers, it is fortunate they were not often tested from a damage perspective. Not a single ship of the class was lost during the war. *Houston* provided proof they could take heavy damage and survive when she was hit twice by torpedoes. The ship's crew gave an outstanding performance in damage control and brought the ship back for repairs. No other Cleveland-class ship was this heavily damaged, and several survived a single torpedo hit with no danger of sinking. Despite their chronic stability problems, they mounted strong antiaircraft and electronic suites which made them well suited for their primary role of screening.

Most importantly, USN 6-inch gun cruisers possessed unrivalled offensive capabilities for a light cruiser. The rate of fire of these weapons was unmatched by any other Navy. On several occasions in the Solomons, the 6-inch gun, combined with radar-guided fire control, proved itself as a ship-killer. When handled correctly, as at the battle of Empress Augusta Bay, USN light cruisers were able to better 8-inch-gun IJN heavy cruisers. In many situations, it is hard to attribute the loss of specific IJN ships to a specific type of USN gun, but 6-inch/47 guns aboard the Brooklyn and Cleveland classes were responsible for the destruction of more major Japanese ships (destroyer size and larger) than any other type of USN gun.



The ability of Cleveland-class cruisers to take heavy damage and survive was demonstrated by *Houston* in October 1944. She was hit by two air-launched torpedoes in the span of three days; the second hit on October 16 is shown here. Despite losing power, she was towed clear of the battle area and reached the New York Navy Yard in March 1945 for repairs.



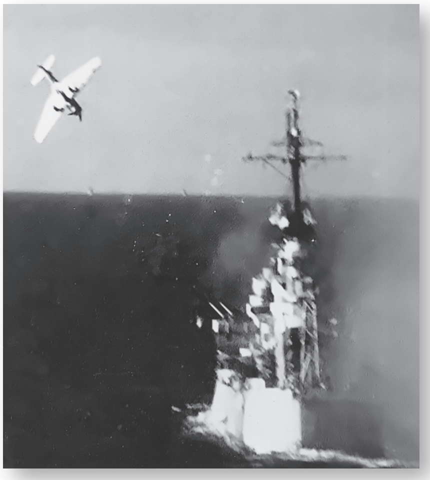
Houston pictured on October 17, 1944 after taking the second of two torpedoes. The damage to her stern is evident; one of the catapults and her aircraft crane has been jettisoned in an effort to lighten the ship. Despite this grievous damage which almost sank the ship, only 55 men were killed.

The postwar story of the USN's light cruisers was brief. Almost all were placed into reserve shortly after the war, and none were brought back into service to serve as gun cruisers. The USN preferred heavy cruisers since their 8-inch guns were more effective for shore bombardment which became the primary Cold War mission of the USN's cruisers. The Brooklyns were quickly retired and six sold to South American Navies. The Atlanta class had a limited postwar career with all but one gone by 1950. Of the 26 Clevelands completed as gun cruisers, only one was kept in service past early 1950. These were not seen as entirely successful ships since they faced severe stability problems their entire careers. Six of them were converted into missile cruisers and fleet flagships which extended their careers to as late as 1979. When the two Worcester-class cruisers were retired in 1958, the era of the USN's light cruisers came to a close.

BIBLIOGRAPHY

Bollinger, Martin, *Warriors and Wizards*, Naval Institute Press, Annapolis, Maryland (2010)
Campbell, John, *Naval Weapons of World War Two*, Naval Institute Press, Annapolis, Maryland (2002)
Ewing, Steve, *American Cruisers of World War II*, Pictorial Histories Publishing Company, Missoula, Montana (1984)
Friedman, Norman, *Naval Firepower*, Naval Institute Press, Annapolis, Maryland (2008)
Friedman, Norman, *U.S. Cruisers*, Naval Institute Press, Annapolis, Maryland (1984)
Friedman, Norman, *Naval Radar*, Conway Maritime Press, Greenwich (1981)
Jordan, John, *Warships After Washington*, Naval Institute Press, Annapolis, Maryland (2011)
Morison, Samuel Eliot, *History of United States Naval Operations in World War II*, (Volumes II, III, V, VI, VII, VIII, IX, XII, XIII, XIV) Little Brown and Company, Boston (1975)
O'Hara, Vincent, *The U.S. Navy Against the Axis*, Naval Institute Press, Annapolis, Maryland (2007)
Terzibaschitsch, Stefan, *Cruisers of the U.S. Navy in 1922–1962*, Naval Institute Press, Annapolis, Maryland (1984)
Whitley, M.J, *Cruisers of World War Two*, Naval Institute Press, Annapolis, Maryland (1995)
Wiper, Steve, *Omaha Class Cruisers*, Classic Warships Publishing, Tucson, Arizona (1999)
www.navsource.org
www.shipcamouflage.com

This remarkable photograph shows a kamikaze about to hit *Columbia* in the Lingayen Gulf on January 6, 1945. The resulting explosion killed 13, wounded 44, and rendered the two aft 6-inch turrets inoperative. The ship remained on station, but was hit by a second kamikaze a few days later which killed another 24 and wounded 97. Again, the cruiser was able to stay in action. This clearly demonstrates the difficulty kamikazes had in inflicting severe damage on armored ships.



INDEX

Note: References to images are in **bold**.

aircraft 5, 17, **22**, 24, 36
Alaska class 6
Aleutian Islands 19
amphibious operations 11, 15, 23
Amsterdam (cruiser) 39
antiaircraft battery 5, 9, 15
  and Atlanta class 30
  and Brooklyn class 26
  and Cleveland class 36, 40
  and Omaha class 17, 18
antisubmarine equipment 30
Anzio 23, 43
armored cruisers 4
Astoria (cruiser) 39
Atlanta (cruiser) 12, 14, **29** (28), 31, 39
Atlanta class 4, **7**, 8, 15, **29** (28), 43, 46, 47
  and design 27–28, 30, 32
  and wartime service 31
Atlantic theater 11, 19, 23, 42–43

Baltimore class 18
battle fleet 4–5
battleships 4
Biloxi (cruiser) 15, 39
Birmingham (cruiser) **10**, **11**, 38
boilers 16, 22, 24, 28, 34, 36
Boise (cruiser) 12, 15, 23, 42–43
Borneo 23, 38
Brooklyn (cruiser) **20**, **22**, 23, 26, 43
Brooklyn class 4, 7, 11, 15, **25** (24), 42–43, 47
  and design 18, 20, 22, 24, 26–27
  and wartime service 23

Cape Esperance, battle of (1942) 12, 23
Cincinnati (cruiser) 10, **11**, **17**, 18, 19
Cleveland (cruiser) **7**, 14, 38, 40, **44–45**
Cleveland class 4, 5, 8, 11, 15, 18, **37** (36), 46, 47
  and design 34–36, 40
  and wartime service 38–39
Cold War 47
Columbia (cruiser) 14, 15, 38, 40, **47**
combat information center (CIC) 10, 40
commerce raiding 4, 5, 6
Concord (cruiser) 19
Congress 4, 6, 15, 20

Dayton (cruiser) 39, **40**
defense 4
Denver (cruiser) 14, 15, **34**, 38
Detroit (cruiser) 18, 19, **21** (20)
Doolittle Raid (1942) 23
Duluth (cruiser) 39

electronics 32, 40
Empress Augusta Bay, battle of (1943) 14–15, 38, 46
escort duty 15

Fargo (cruiser) **36**
Fargo class 4, 34–36
Fast Carrier Force 15, 19, 31, 38, 39
Flint (cruiser) 31, 32
France 7, 11, 19
Fresno (cruiser) 31

Galveston (cruiser) 39
Gilbert Islands 31, 38
Great Britain 7
Guadalcanal campaign (1942–43) 11–12, 14, 23, 31, 38, 46
guided-missile cruisers 34, 38, 39

Helena (cruiser) **13** (12), 14, 23, **25** (24), 26, 34, 42, 43
Hiei (Japanese battleship) 12, 14
Honolulu (cruiser) **6**, 14, 23, **25** (24), 26
Houston (cruiser) **37** (36), 39, 46, **47**

Imperial Japanese Navy (IJN) 5, 6, 7, 11–12, 14, 46
  and Mogami class 20
Independence class 34
insulation 17
Iwo Jima 39

Japan 5, 7, 31, 39; *see also* Imperial Japanese Navy
Juneau (cruiser) 12, 14, **30**, 31

kamikazes 10, 23, 32, 38, 39, **47**
Kolombangara, battle of (1943) 14, 23, 38
Komandorski Islands, battle of (1943) 11, 19
Korean War (1950–53) 39, 41
Kula Gulf, battle of (1943) **13** (12), 14, 23

Leyte Gulf, battle of (1944) 15, 23, 31, 38
Little Rock (cruiser) 39
London Naval Treaties:
  first (1930) 6, 7, 18, 20
  second (1936) 7–8, 27

Manchester (cruiser) 39
Marblehead (cruiser) 11, **15**, **16**, 19, 42
Marianas Islands 23, 38, 39
Mediterranean theater 19, 23
Memphis (cruiser) 18, 19
Miami (cruiser) **5**, 15, 39
Milwaukee (cruiser) 19
Mobile (cruiser) 15, 38
Montpelier (cruiser) 14, **34**, 38

Nashville (cruiser) 11, 23, **25** (24), 26, 42
National Industrial Recovery Act (1933) 18
Netherlands East Indies (NEI) 15, 23, 42
Neutrality Patrol 19, 23
New Guinea 23
North Africa 11, 23, 38

Oakland (cruiser) 31, 32
Okinawa campaign (1945) 23, 31, 38, 39
Oklahoma City (cruiser) 39
Omaha (cruiser) 19, **21** (20)
Omaha class 4, 7, 11, **21** (20), 42
  and design 15–18
  and wartime service 19

Pacific War (1941–45) 6, 11–12, 14–15
Pasadena (cruiser) 38
"peace" cruisers 4
Pearl Harbor 19, 23, 42
Philadelphia (cruiser) 23, 26, 43
Philippine Sea, battle of (1944) 31, 38
Philippines, the 15, 23
Phoenix (cruiser) 15, 23, 26
Portsmouth (cruiser) 39
protection 16–17, 20, 22, 28, 34, 41
Providence (cruiser) 39

radar 5, 10, 12, 14
  and Atlanta class 32
  and Cleveland class 40
  and Omaha class 18
Raleigh (cruiser) **12**, 19, **21** (20), 42
Reno (cruiser) **29** (28), 31, **46**
Richmond (cruiser) 11, 19
Roanoke (cruiser) 41
Royal Navy (RN) 6

St. Louis (cruiser) 14, 23, 24, 26
Salerno 23, 43
San Diego (cruiser) **30**, 31, 32
San Francisco (cruiser) 12
San Juan (cruiser) **10**, 31, 32, **33** (32)
Santa Cruz, battle of (1942) 31, **33** (32)
Santa Fe (cruiser) 15, 38
Savannah (cruiser) 23, 26, 42–43
Savo Island, battle of (1942) 31
scout cruisers 4–5, 15–17
shore bombardment 15, 42, 47
Sicily 23, 38, 42–43
Solomon Islands 12, 14–15, 23, 38, 42, 46
Soviet Union 19
speed 16, 20, 22, 28, 36
Spokane (cruiser) 31
Springfield (cruiser) 38
Surigao Strait, battle of (1943) 23, 38

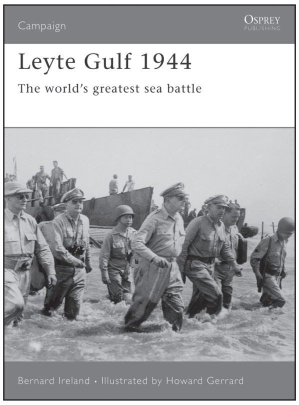
Tassafronga, battle of (1942) 14, 23
tonnage 6–8, 20, 27–28, 41
Topeka (cruiser) 39
torpedos 5, 12, 14, 43, 46
Trenton (cruiser) 19
Tucson (cruiser) 31

US Navy (USN):
  7th Fleet 15, 23
  Asiatic Fleet 19, 23, 42

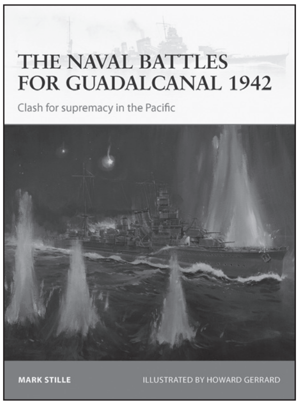
Vicksburg (cruiser) 39
Vincennes (cruiser) 15, **37** (36), 38, **39**, 40
Vinson-Trammell Act (1934) 8

Washington Naval Treaty (1922) 5, 6
weaponry 8–10
  3-inch gun 26
  5-inch gun 7, **8**, 24
  6-inch gun 5, 6, 7, 16, 17, 46
  8-inch gun 5, 6, 41, 47
Wichita class 18
Wilkes-Barre (cruiser) 39
Worcester (cruiser) 41
Worcester class 4, 8, 41–42, 47
World War I (1914–18) 4, 15

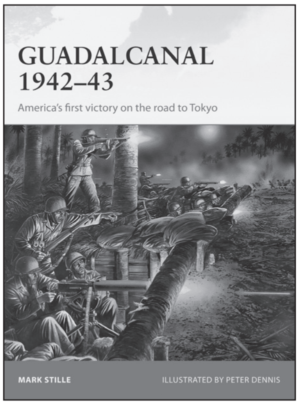
Discover more at www.ospreypublishing.com


Campaign
Osprey Publishing
Leyte Gulf 1944
The world's greatest sea battle
Bernard Ireland • Illustrated by Howard Gerrard

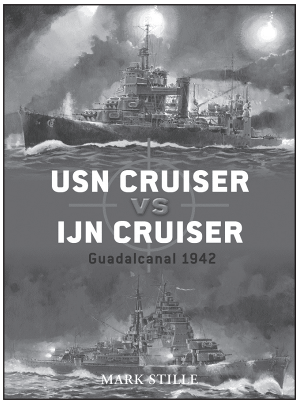
CAM No: 163 • **ISBN:** 978 1 84176 978 3


THE NAVAL BATTLES FOR GUADALCANAL 1942
Clash for supremacy in the Pacific
MARK STILLE
ILLUSTRATED BY HOWARD GERRARD

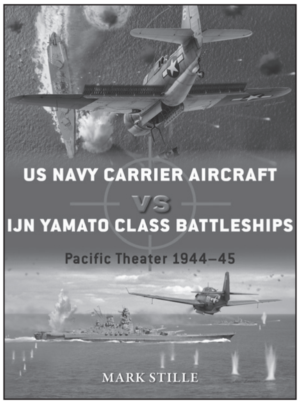
CAM No: 255 • **ISBN:** 978 1 78096 154 5


GUADALCANAL 1942–43
America's first victory on the road to Tokyo
MARK STILLE
ILLUSTRATED BY PETER DENNIS

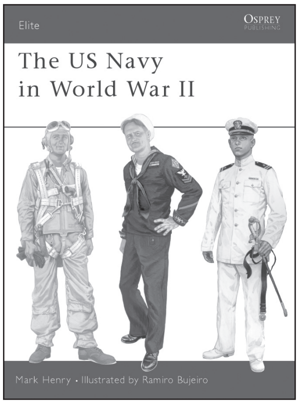
CAM No: 284 • **ISBN:** 978 1 4728 0693 2


USN CRUISER
VS
IJN CRUISER
Guadalcanal 1942
MARK STILLE

DUE No: 22 • **ISBN:** 978 1 84603 466 4


US NAVY CARRIER AIRCRAFT
VS
IJN YAMATO CLASS BATTLESHIPS
Pacific Theater 1944–45
MARK STILLE

DUE No: 69 • **ISBN:** 978 1 4728 0849 3


Elite
Osprey Publishing
The US Navy in World War II
Mark Henry • Illustrated by Ramiro Bujeiro

ELI No: 80 • **ISBN:** 978 1 84176 301 9

SIGN UP FOR THE OSPREY NEWSLETTER AND WIN! 5 OSPREY BOOKS

Sign up to the *Osprey e-newsletter* to get all the latest news, great special offers, information about new releases and get an exclusive look inside life at Osprey. You will then be in with a chance to win some great prizes in our monthly prize draw.

Every month we will be selecting **one newsletter recipient** who will **receive** any **5 Osprey books** of **their choice**. A range of other prizes, from exclusive artwork prints to free ebooks, will also be given away throughout the year to newsletter recipients.

Go to: www.ospreymailing.com

Enter your email address to register